Small Animal Husbandry to Improve Mother and Child Nutrition in Rural Bolivia

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List of Acronyms

ASF	Animal Source Food
CENDA	Centro de Comunicación y Desarrollo Andino
DFATD	Department of Foreign Affairs, Trade and Development
PMF	Performance Measurement Framework
ZAC	Zona Andina de Cochabamba (Andean Zone of Cochabamba)

1. Executive Summary

The project "Small Animal Husbandry to Improve Mother and Child Nutrition in Rural Bolivia" started its activities in July 2012 in the Zona Andina de Cochabamba (ZAC, Andean Zone of Cochabamba). HealthBridge Foundation of Canada worked in close coordination with its local implementing partner CENDA to execute the project. Over the 42 months of implementation, the project received a total of $648,220 in funding support, with $499,546 from the Department of Foreign Affairs Trade and Development (DFATD) and $148,674 in donations from Canadian private sector entities and individuals.

ZAC is one of the poorest areas of Bolivia, with high levels of food insecurity and child malnutrition. Malnutrition has life-long consequences, including decreased cognitive ability and reduced physical work capacity, as well as immune system impairment and increased risk of chronic diseases, such as cardiovascular diseases and hypertension. Due to the geographical and cultural isolation of many ZAC communities, the local diet, comprised of mainly tubers and grains and low intakes of animal-source foods (ASF), has low and inadequate levels of numerous nutrients including zinc, vitamin A, riboflavin and vitamin B12, and fat.

Confronting these problems, the project arose with the ultimate goal of sustainably improving food security and nutrition in poor rural households in the department of Cochabamba, Bolivia. The project focused on the potential of communities, rather than the needs of the communities. In other words we used a resiliency lens, rather than a poverty lens. To contribute to fulfilling the ultimate goal, the project had three intermediate outcomes:

1. **Increased production of meat or eggs in participating communities**. The project promoted chicken rearing in the *Cabecera de valle (mountain valley)* communities to increase egg production, and improved management of sheep in communities of the *Puna (high plains)* to increase meat production.
2. **Increased consumption of meat or eggs among women and children and improved child feeding practices.** To this end, nutrition promotion was oriented to the importance of the consumption of ASF, for children and women, and greater knowledge of good child feeding and breastfeeding practices.
3. **Improved decision-making authority of women in relation to animal husbandry practices, and use of family resources.** The project emphasized the importance of men and women making joint decisions and sharing responsibility for animal husbandry and child feeding.

Project Beneficiaries

Direct beneficiaries comprised 509 families from 25 communities and 3 boarding schools, that directly received building materials for chicken coops or improved corrals. The families in the 22 *Cabecera de valle* (chicken) communities also received chickens to serve as a starter flock. The project had 8097

indirect beneficiaries who received some training on animal management, nutrition and/or the project results and lessons learned, but did not directly receive any materials.

Overall Project Performance Assessment

Ultimate Outcome: Improved food security and nutritional status among poor rural households in participating communities

The Ultimate Outcome was assessed through measuring energy intakes and fat intakes of women and children. Dietary energy intakes stayed relatively constant for women and children. Fat intakes remained relatively constant for women, but levels dropped for children in both the chicken and sheep communities. Findings from the 24-hour dietary recall data indicated that, while egg and meat consumption increased, the consumption of purchased oils and fats were reduced, offsetting the increased fat from the eggs and meat. We do not know why the consumption of oils and fats changed, although we assume that other factors were involved, such as price fluctuations, random variation and perhaps measurement error.

The project worked towards improving diets principally through increasing production and consumption of meat and eggs. But as is true in any study, the promoted changes in the diet take place (or not) against an ever-changing landscape of dietary changes, due to change in harvest, markets, employment, food preferences and other unknown factors. Achieving the ultimate goal of improving total energy and fat intakes depends on many social, cultural, political and economic factors, outside the scope of this project.

Intermediate Outcome 1100: Increased production and consumption of meat or eggs in participating communities

Although fat intakes did not change, the project was successful in promoting meat and egg production and consumption in the participating communities. Towards increasing production of eggs in the chicken communities, the project interventions increased the average number of chickens per household from 1.5 to 6, and increased egg production from 0.7 eggs to 4 eggs per day. These changes were achieved through improving the construction of chicken coops and improving breeding, feeding and health care of the chickens to ensure adequate reproduction of the flock. Participating families also received a sheet of corrugated zinc to serve as the roof of the chicken coop, and 5-10 chickens, including 2 different breeds, to serve as a starter flock.

In the sheep communities, the project aimed to increase meat production primarily by increasing flock turnover and harvest rates. The project interventions led to higher birth rates and lamb survival – two factors which are necessary to increase flock turnover and harvest rates. This was achieved through adding a roof to the sheep corrals so that animals were projected from the elements, improving care of the animals' health, and improved forage production to increase availability of feed. Participating families received a sheet of corrugated zinc for the roof of the corrals.

Outcome 1200: Increased intake of meat or eggs among women and children and improved child feeding practices in participating communities

The project nutrition promotion activities emphasized the importance of meat and egg consumption for women and children, and appropriate child feeding practices. At the beginning of the project, most men and women associated good nutrition with fruits and vegetables, and were unaware of the nutritional benefits of meat and eggs. At end of the project, approximately 90% of men and women knew the importance of egg and meat in children's diet, and this also led to changes in consumption practices. In the chicken communities:

- The percentage of children and women who had eaten eggs in the last 24 hours increased from 15% to 68% in children and 16% to 62% in women, surpassing the target of 60%.
- The average egg intake (grams/day) also increased for beneficiaries, from about one-tenth of an egg to half an egg per day for both women and children.

The project expected that the percentage of energy from ASF would increase in the chicken communities, however levels only increased slightly in women (from 4-7%), and actually decreased in children (from 14% to 9%). The project team does not know why this reduction in children occurred. Although egg consumption increased, it may be that the increase was not enough to offset other changes in the diet (such as seasonal, annual, secular and random changes).

In the sheep communities:

- The percentage of women and children who had eaten meat in the last 24 hours increased from 57% to 83% in children and 74% to 93% in women, surpassing the target of 60%.
- The percentage of dietary energy from ASF increased in both children (from 12% to 19%) and women (from 8% to 19%).

While the project was not able to assess changes in child feeding practices, due to the small sample size of children in the relevant age category, qualitative findings indicated that the majority (90%) of men and women understand appropriate breastfeeding practices as a result of the training provided through the project.

Outcome 1300: Improved decision making authority of women relating to animal husbandry practices and use of family resources in participating communities

The initial study on gender dynamics revealed that decisions made related to agricultural production and use of food produced (whether for consumption or sale) are made jointly by men and women. However, most men and women did not understand that the main food deficiency in the families was related to low consumption of meat and eggs. While farming activities are shared between men and women in a complementary manner, child care and feeding are primarily the responsibilities of women, particularly in the chicken communities. Thus, the project worked to maintain the spirit of dialogue and shared decision making while raising awareness of the importance of meat and eggs for women and children and the importance of shared responsibility for child feeding. Project activities engaged both men and women in the training workshops and farmer to farmer sharing of experiences.

Findings from the endline evaluation revealed that the spirit of shared decision making had been maintained by the project, and around 90% of men and women now understand the importance of meat and egg consumption for children. Families also became more aware that child feeding should not be an isolated task, and support from both parents is important. Men, in particular, are now more engaged in child care, they engage in discussions about child care, and they know the benefits of good child feeding practices.

Success Factors

Key factors related to the success of the project are listed below:

- *Relevance:* The project interventions – chicken and sheep rearing – are traditional activities in the communities. This increased interest and allowed families to build on traditional knowledge.
- *Appropriateness of design*: The project approach to animal husbandry focused on 4 themes: infrastructure of the shelter, animal nutrition, animal health and animal reproduction. This has allowed the families to follow the process of development and enabled them to contribute their own knowledge to the process and provide feedback.
- *Sustainability*: The project promoted animal feed and medications that can be produced and prepared using local inputs. The design of the animal shelters was adapted to the materials available in the community, and the project only donated the sheet metal that is difficult to access and very long lasting
- *Partnership*: CENDA established strong partnerships with the local communities. The community as a whole was involved in the decision to participate in the project, and a participatory approach allowed community members to contribute their own knowledge and experience.

- *Innovation:* For nutrition promotion, using a process of reflection with families, linking child nutrition with child health, physical and intellectual development and emphasizing the contribution of ASF, was an important factor in the success of the project.

Lessons Learned and Recommendations

Key lessons learned and recommendations are as follows:

- *Nutrition promotion*: It is important that nutrition promotion is conducted *before* implementation of the agricultural/livestock interventions and delivery of materials. This increases the likelihood that families will implement the interventions and use the materials as the project intends, and not for some other purpose.
- *Construction of animal shelters:* A lesson learned in constructing the sheep corrals was the need to leave openings in the walls (i.e. the stones must not be too close together) to allow the entry of air for ventilation to help control the presence of fleas, ticks and other parasites. In addition, timing of the project should ensure that the manufacturing of the adobe bricks (used to build the corral walls) is during the dry season to avoid problems from the rain.
- *Starter flocks*: The starter flocks were supposed to be 7 hens and one rooster. However, identification of the sex of the chickens at an early age was difficult and some families received 4 roosters instead of one. It may have been better to wait until the chickens reached 4 or 5 months of age, when the differential characteristics of hens and roosters become more apparent.
- *Chicken feed*: One of the most important elements of feeding hens is the calcium for bone development and egg formation. Some families incorporated ground egg shell into the feed. Using vermiculture as a source of protein was not successful in this region, as most of the worms died due to dehydration or waterlogging. A more successful approach was to allow the chickens to hunt insects in the plots of land used for crop production, which also served as a form of biological control.
- *Egg production:* Practices that families used to reduce crop destruction also influenced egg production. During the productive months, families would move with their animals to temporary housing (called “transhumance”) or they would enclose the hens in hen housing to prevent them from damaging crops. Both of these practices cause stress to the hens, and limit their access to grass, worms and calcite, which reduces egg production.
- *Gender*: We did not address gender issues related to responsibilities for domestic activities other than child feeding, nor domestic violence or participation of women in decisions about communal space. An in-depth study on these issues would provide better understanding of their impact on women and children`s health, nutrition and workload, and how they could be addressed.

2. Introduction

This report is the Final Report of the project "Small Animal Husbandry to Improve Mother and Child Nutrition in Rural Bolivia, which was implemented from July 4 2012 – March 31 2016 by HealthBridge Foundation of Canada (HealthBridge) in collaboration with its local partner CENDA (Centro de Comunicación y Desarrollo Andino, the Center of Andean Communication and Development). Below is an overview of the main sections of the report.

Section 3 Project Summary: Describes the project rationale, expected outcomes, beneficiaries and key stakeholders involved in the project.

Section 4 Project Context: An analysis of the project external and internal context.

Section 5 Overall Project Performance Assessment: An assessment of the outcomes achieved versus expected targets and baseline data.

Section 6 Project Management: A description of the project management approaches related to governance, work planning and logistics, monitoring and reporting and public relations.

Section 7 Risk Management: A description of the original risk assessment and risk events which occurred during the project and strategies used to address them.

Section 8 Cross Cutting Themes Priorities: A report on the implementation of the gender equality strategy, integration of environmental and governance considerations.

Section 9 Budget Management: An analysis of the initial budget forecasts compared to actual disbursements, as it relates to the project activities and intermediate outcomes.

Section 10 Success Factors: An assessment of the success factors based on DFATD's Framework of Results and Key Successes: a) relevance, b) appropriateness of design, c) sustainability, d) partnership, e) innovation, f) appropriateness of resource utilization, and g) informed and timely action.

Section 11 Lessons Learned and Recommendations: A description of the key lessons learned and recommendations for future interventions.

Section 12 Final Financial Report: The project Financial Report, set out in Form C, showing actual disbursements for each budget line in comparison to budgetary estimates.

3. Project Summary

Project Rationale, Objectives and Outcomes

The project "Small Animal Husbandry to Improve Mother and Child Nutrition in Rural Bolivia" started its activities in July 2012 in the Zona Andina de Cochabamba (ZAC, Andean Zone of Cochabamba). HealthBridge Foundation of Canada worked in close coordination with its local implementing partner CENDA to execute the project. Over the 42 months of implementation, the project received a total of $648,220 in funding support, with $499,546 from the Department of Foreign Affairs Trade and Development (DFATD) and $148,674 in donations from Canadian private sector entities and individuals.

ZAC is one of the poorest areas of Bolivia, with high levels of food insecurity and child malnutrition. Malnutrition has life-long consequences, including decreased cognitive ability and reduced physical work capacity, as well as immune system impairment and increased risk of chronic diseases, such as cardiovascular diseases and hypertension. Due to the geographical and cultural isolation of many ZAC communities, families depend on their own food production, with staple crops of tubers and grains. Intake of animal source food (ASF) is low in the region. To obtain meat, eggs and other vegetables, families must travel long distances to markets located in more central communities. Consequently the local diet, comprised of mainly tubers and grains and low intakes of ASF, has low and inadequate levels of numerous nutrients including zinc, vitamin A, riboflavin and vitamin B12, and fat.

At baseline, dietary fat contributed only approximately 14% and 8% of dietary energy in children and women, respectively, in the chicken communities, and 12% and 11% in children and women, respectively, in the sheep communities. Levels in both communities were much lower than the recommended minimum of 20% and 15% for children and women, respectively. Only 11% and 6% of the dietary energy consumed by children and women, respectively, was provided by ASF. While there are no specific recommendations for how much ASF should be consumed, the low intakes of ASF would have resulted in low intake of many nutrients.

Low intake of ASF is related to low animal production. In communities of the *Puna* (high mountain plains), at baseline, there were no chickens, although families had sheep, with an average herd size of 63 per family. However, fecundity rates were low (41%) and lamb mortality rates were high (6%). Consequently, families were reluctant to consume the sheep frequently. In communities in the *Cabecera de valle* (mountain valleys), there are far fewer sheep (because there is little pasture), but most families owned a few chickens (an average of 1.5 hens per family, with average production of 0.7 eggs per day per family). An intervention which allowed for improved animal husbandry, and thus

increased availability of ASF for consumption, would be useful to improve nutrient consumption amongst women and children.

In addition to low ASF consumption, our baseline results showed that breastfeeding practices were often inappropriate, with only 15% of the mothers breastfeeding their newborns immediately after delivery, only 56% practicing exclusive breastfeeding (which is probably an overestimate), and only 46% of mothers breastfeeding their child for at least two years.

Confronting these problems, the project arose with the ultimate goal of sustainably improving food security and nutrition in poor rural households in the department of Cochabamba, Bolivia. To contribute to fulfilling this ultimate goal, the project had three intermediate outcomes:

1. **Increased production of meat or eggs in participating communities**. This related to improving the availability of meat or eggs, by first understanding the farming/production situation, and subsequently improving animal husbandry practices. This involved providing resources, and improving knowledge of livestock practices, and soil and fodder management. The project promoted chicken rearing in the *Cabecera de valle,* and improved management of sheep in communities of the *Puna*.

2. **Increased consumption of meat or eggs among women and children and improved child feeding practices.** To this end, nutrition promotion was oriented to men and women having greater awareness of the importance of the consumption of ASF, particularly for the health and well-being of children and women, and greater knowledge of good child feeding and breastfeeding practices.

3. **Improved decision-making authority of women in relation to animal husbandry practices, and use of family resources.** To achieve this result, workshops were conducted with a gender perspective, and household visits were carried out to discuss the importance of men and women making joint decisions concerning children's food.

The project focused on the potential of communities, rather than the needs of the communities. In other words we used a resiliency lens, rather than a poverty lens. Diagrams showing the hypothesized pathways through which the intervention would proceed from introduction of materials in the community to improved health are shown in Figures 1 and 2 below.

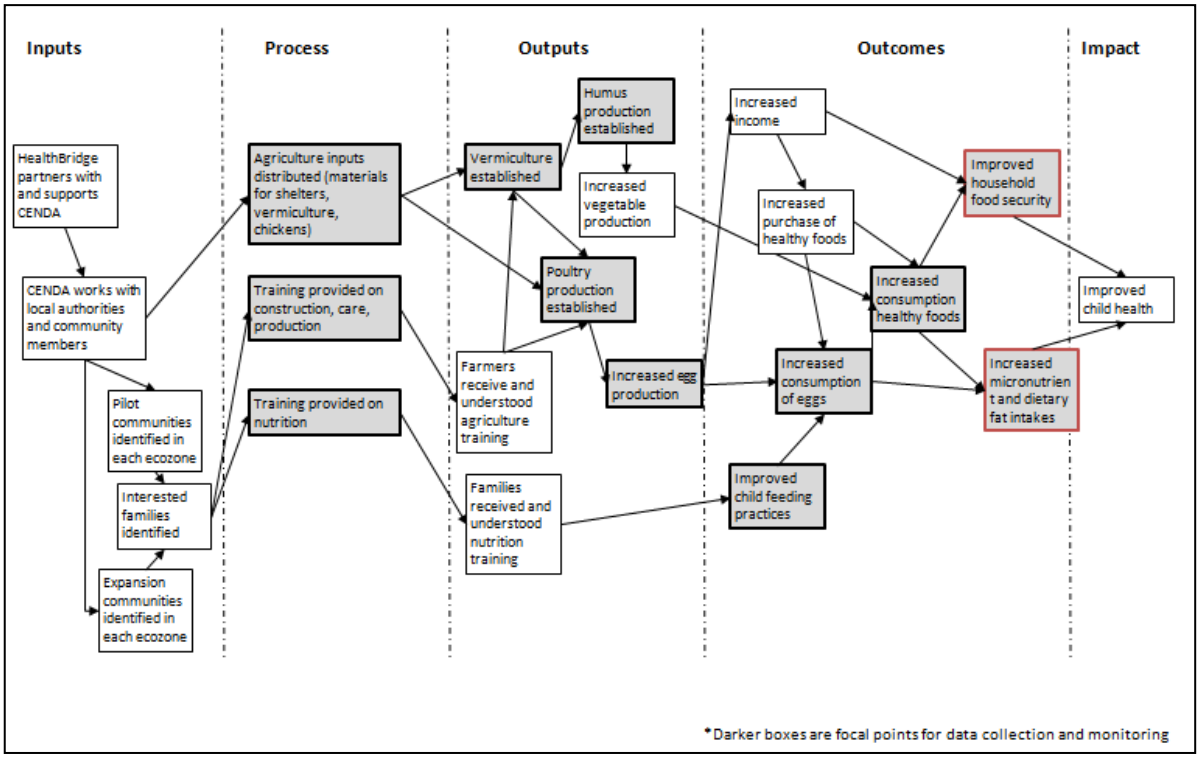

Figure 1: Hypothesized pathway through which HealthBridge and CENDA will contribute to improved child health outcomes (Chickens)

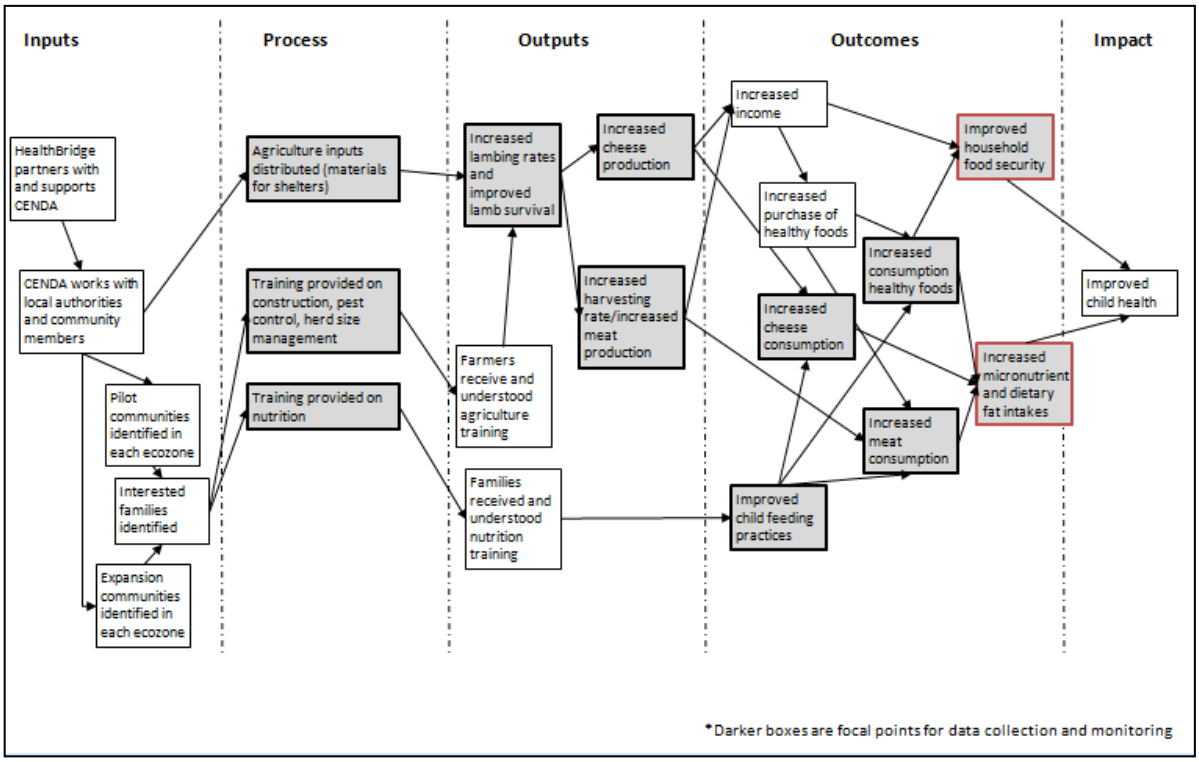

Figure 2:Hypothesized pathway through which HealthBridge and CENDA will contribute to improved child health outcomes (Sheep)

Project Beneficiaries

Direct beneficiaries of the project comprised 509 families from 25 communities and 3 boarding schools, which directly received building material for chicken coops or improved corrals. The families in the 22 *Cabecera de valle* communities also benefited with the delivery of 5 to 10 chickens, including two different breeds, to serve as a starter flock. The project had 8097 indirect beneficiaries who received some training on animal management, nutrition and/or the project results and lessons learned, but did not directly receive any materials from the project. The following table shows direct and indirect beneficiaries, with direct sheep communities shaded in purple and direct chicken communities shaded in orange.

Table 1: Project direct and indirect beneficiaries by community

Not	Community / area	Direct beneficiaries (# families)	Direct & Indirect beneficiaries	Type of action
1	Chillavi	33	50	Sheep intervention and nutrition promotion
2	Valentía	12	35	Chicken intervention and nutrition promotion
3	Ñuñumayani	22	50	Chicken intervention and nutrition promotion
4	Bajo Chillavi	15	22	Sheep intervention and nutrition promotion.
5	P'alta Cueva	17	23	Sheep intervention and nutrition promotion
6	Chilliguani	26	35	Chicken intervention and nutrition promotion
7	Kochipampa	20	25	Chicken intervention and nutrition promotion
8	Chajuela	24	32	Chicken intervention and nutrition promotion
9	Titakallu	18	32	Chicken intervention and nutrition promotion
10	Kuchiyo	9	15	Chicken intervention and nutrition promotion
11	Lamphani	7	13	Chicken intervention and nutrition promotion
12	Wayko Arriba	11	17	Chicken intervention and nutrition promotion
13	Wayko Abajo	14	20	Chicken intervention and nutrition promotion
14	Cerezo Waycha	7	9	Chicken intervention and nutrition promotion
15	Condor Waycha	9	12	Chicken intervention and nutrition promotion
16	Kochirancho	7	15	Chicken intervention and nutrition promotion
17	Tujsapujyu	33	40	Chicken intervention and nutrition promotion
18	Jachasola	11	18	Chicken intervention and nutrition promotion
19	Pucara	8	17	Chicken intervention and nutrition promotion
20	Colca Chico	9	17	Chicken intervention and nutrition promotion
21	Jironkota	11	20	Chicken intervention and nutrition promotion
22	Chillca Chico	23	27	Chicken intervention and nutrition promotion
23	Chillca Grande	49	56	Chicken intervention and nutrition promotion
24	Kjarkas	31	85	Chicken intervention and nutrition promotion
25	Chiruni	8	12	Chicken intervention and nutrition promotion
26	Internado Titakallo	25	50	Chicken intervention and nutrition promotion
27	Internado Pongo K'a	25	45	Chicken intervention and nutrition promotion
28	Unidad educativa Chillca Grande	25	70	Chicken intervention and nutrition promotion
29	Unidad educativa Tujsapujyu		70	Socialization of results and nutrition promotion

Not	Community / area	Direct beneficiaries (# families)	Direct & Indirect beneficiaries	Type of action
30	Comunidad Challa Grande		60	Training in handling sheep and nutrition promotion.
31	Subcentral Calientes		45	Socialization of results and nutrition promotion
32	Subcentral Totorani		60	Socialization of results and nutrition promotion
33	Listeners to *Radio Andina*		4,000	Socialization of results and nutrition promotion
34	Readers of the newspaper *Conosur Ñawpaqman*		3,000	Socialization of results and nutrition promotion
	Total	**509**	**8097**	

Governance Structure

HealthBridge was responsible for the implementation of the project, and the preparation of technical and financial reports to DFATD. HealthBridge also provided technical advice and led the processing and analysis of the nutrition data. CENDA was the local partner responsible for the execution of the project in the field. The local project team comprised the Field Project Manager, Agronomist, Nutritionist, Field Assistants, Financial Administrator staff and a Driver. Consultants external to the project were also hired to provide technical advice.

4. Project Context

The project was implemented in 25 communities of the ZAC, the poorest part of Cochabamba, with high levels of food insecurity and isolation from the urban centers. As in other Andean communities, the local people practice subsistence agriculture, which does not generate income adequate for the needs of the families. Potatoes and cereals are the most important food crops, and livestock (including cattle, llamas, alpacas, and poultry) are complementary to the crops. The animal manure is used as fertilizer. The larger animals serve as reserve capital for the families and only occasionally are the animals used for food on holidays and on special occasions.

Being an area with known high levels of food insecurity, other institutions and agencies have worked in nutrition for years before the implementation of this project. From the State, the area has been covered by the Program of Support to Food Security, which financed projects for the breeding of guinea pigs (a traditional food). However, the lack of food for the guinea pigs, low levels of support and technical assistance, as well as certain cultural issues with regard to these animals, led to the failure of this initiative. Thus, working with guinea pigs was not feasible in this area.

In the last stage of the Program of Support to Food Security initiative, greenhouses were constructed in some of the communities for the production of vegetables. Given that our project included nutrition

promotion, emphasizing the about the importance of a diverse diet, the project team coordinated with the technical staff who ran the greenhouses project. The project team also coordinated with local health centres, which ran a State campaign to monitor mothers and children during pregnancy and early childhood, to raise awareness of breastfeeding practices.

To generate additional income, many families in the beneficiary communities take part in other economic activities, such as mining, and temporary migration to urban centres, areas of coca production, or industrial farms. The increase in temporary migration for work has resulted in an increased burden of home and farm responsibilities on women, since it is generally men who migrate for work. Women and children have most of the responsibilities related to food in the home and health of the chickens, especially in times of temporary migration, between July and September each year.

In the first year of implementation of the project in the *Puna* area there was very heavy snowfall. Many sheep and camelids (llamas and alpacas) died due to the cold and lack of feed or pasture. This affected the project in both positive and negative ways. It was positive because there was great interest in the construction of improved corrals (which could protect the ewes and lambs from the heavy snows). It was negative because it reduced the herd size, and with fewer sheep, meat consumption was lower.

Finally, in 2015, the last year of implementation of the project, there were presidential and municipal elections in Bolivia. The elections generated a strong political mobilization by the communities, especially the community leaders. However this did not interfere with the project activities.

5. Overall Project Performance Assessment

5.1 Methods

The PMF in Annex B provides details on the data sources and collection methods used to measure each of the project's outcomes, as well as baseline data, targets and endline data. Studies were conducted in four main thematic areas: a) Food intake of women and children, assessed through 24-hour dietary recalls; b) Production of meat and eggs, assessed through study of the "flows" of meat, c) Breastfeeding practices, assessed through a household survey; d) gender dynamics, assessed through focus groups and direct observation.

We would like to note one minor change in the PMF for Intermediate Outcome 1200, indicator "intake of meat and eggs": Originally, the data from the 24 hour recall was presented as "% of days in which meat, dairy and eggs is eaten". Although this is a legitimate interpretation of the data, we have changed this to "% of children who had eaten meat, eggs and dairy in last 24 hours", as this is a

preferred interpretation of the results in the context of this project. The baseline results have been modified to reflect this interpretation.

Data collection through 24 hour dietary recalls was conducted three times – in February and March of 2013, 2014 and 2015. The project schedule in the targeted communities, including timing of data collection, arrival of materials and training workshops, is illustrated in Figure 3 below. Results are presented in the PMF, and discussed in the subsequent sections below.

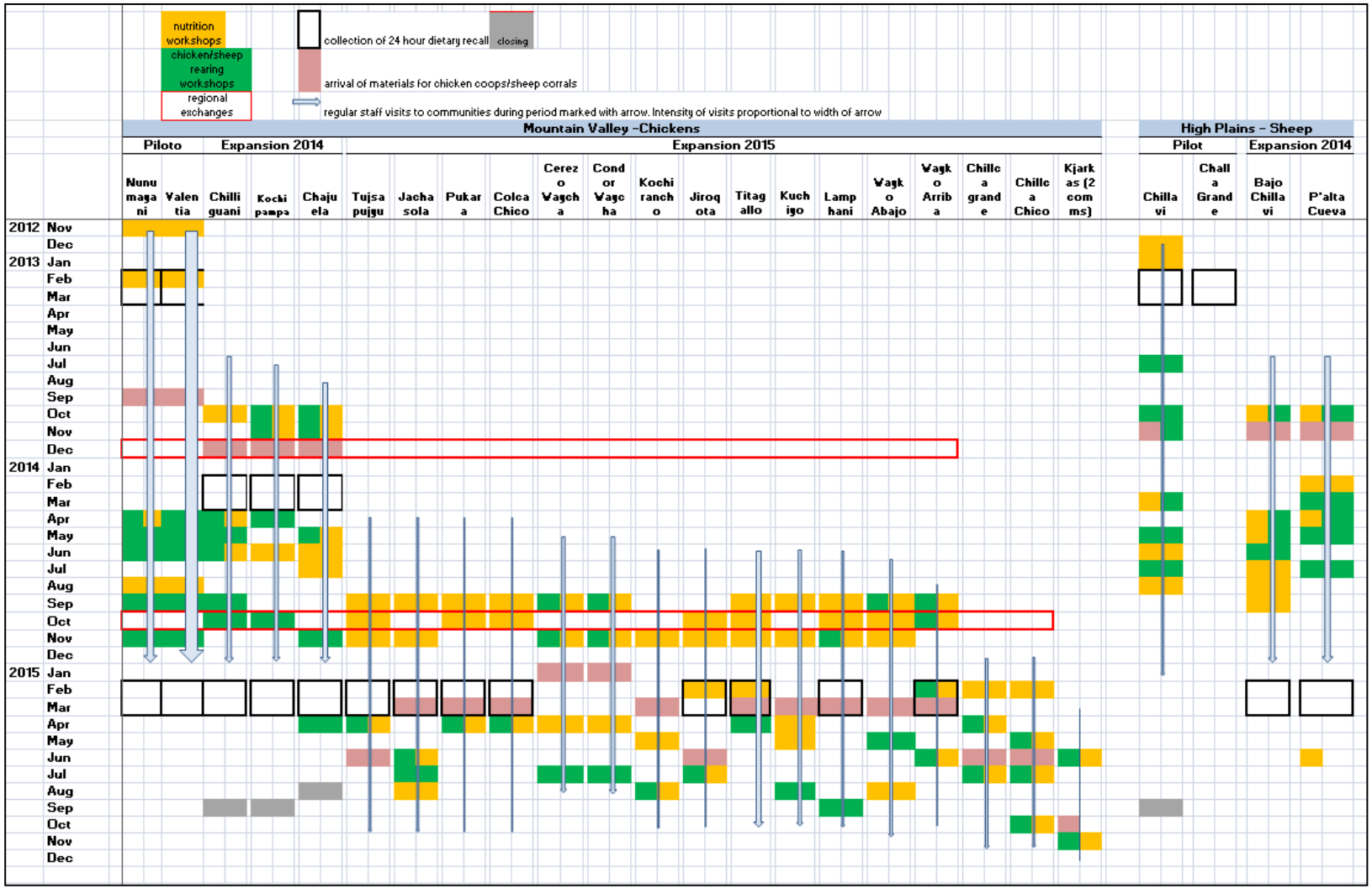

Figure 3: Project Schedule: Workshops, Delivery of Materials, Data Collection

5.2 Ultimate Outcome

The ultimate goal of the project was "improved food security and nutritional status among poor rural households of the department of Cochabamba, Bolivia, particularly for women and children". This outcome was operationalized by two indicators: 1) Household Food Security (measured through dietary energy intakes) and 2) Fat intakes (as a percentage of energy intakes) of women and children.

Figures 4 and 5 below, show dietary energy intakes for women and children over three years of project implementation. Energy intakes are also shown for "new" communities just starting the chicken intervention in 2015, which can serve as controls for the chicken communities. Compared to baseline, dietary energy intakes stayed relatively constant for women and children. While energy intakes were lower at endline than at baseline in the sheep communities, the levels were still considered adequate.

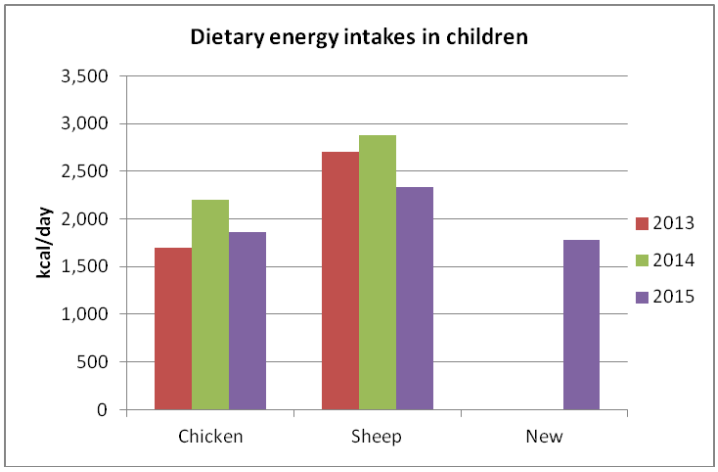

Figure 4: Dietary energy intakes in children by project intervention and year

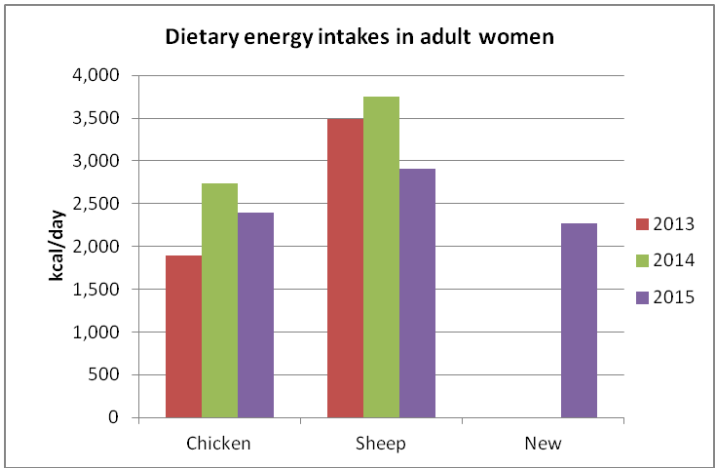

Figure 5: Dietary intakes in adult women by project intervention and year

Figures 6 and 7 below, show the percentage of dietary energy from fat in children and women, respectively, over the three years of project implementation. While fat intakes remained relatively constant for women, levels dropped in children in both the chicken and sheep communities. Findings from the 24-hour recall data indicated that, while egg and meat consumption increased, the consumption of purchased oils and fats were reduced, offsetting the increased fat from eggs and meat. Our project did not aim to change purchased oils and fats in the diet. We assume that there were other factors involved, such as price fluctuations, random variation or perhaps measurement error. In any case, we do not know why these changes occurred, nor if the project contributed to them.

Achieving the ultimate goal of improving total energy and fat intakes depends on many social, cultural, political and economic factors, outside the scope of this project. However, the project contributed to the potential of achieving this goal through realization of its intermediate outcomes: increasing levels of meat and egg production and consumption. This is discussed in more detail in section 5.3

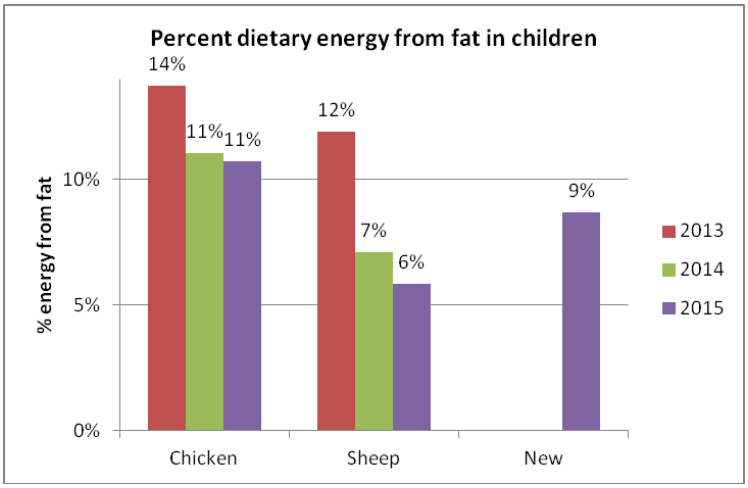

Figure 6: Percent dietary energy from fat in children

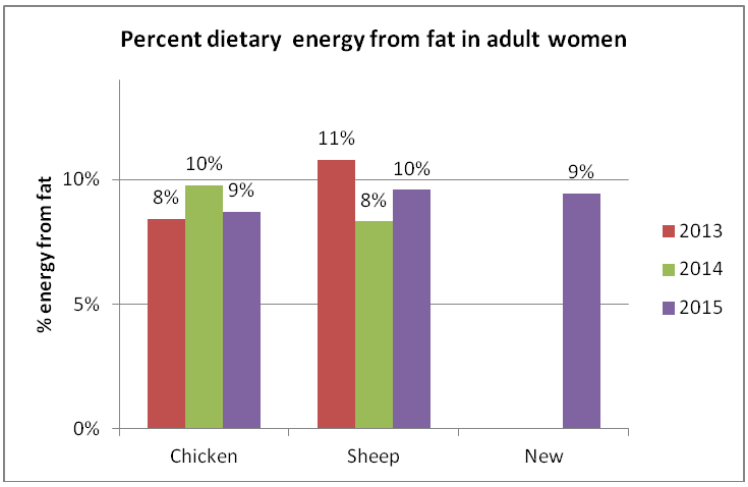

Figure 7: Percent dietary energy from fat in adult women

5.3 Intermediate Outcomes

Outcome 1100: Increased production of meat or eggs in participating communities

The project aimed to increase the production of meat or eggs, through increasing the number of chickens per household and increasing the turnover of sheep (higher birth rate, higher harvest rate), to ultimately increase ASF consumption by women and children. Three immediate outcomes contributed to achieving this intermediate outcome, namely:

- 1110 Increased recognition of the inter-play between existing small animal husbandry, child feeding practices, dietary preferences, gender dynamics, food production and consumption, and the nutritional status of women and children;
- 1120: Greater knowledge among male and female farmers of suitable animal breeds and appropriate animal husbandry practices; and
- 1130 Increased knowledge among men and women farmers of proper forage management to ensure adequate animal feed.

To achieve immediate outcome 1110, the project conducted studies in four thematic areas (food intake through 24-hour dietary recalls, meat 'flows', breastfeeding, and gender dynamics), as described in Section 5.1. The results of these studies increased understanding of the situation in the targeted communities, and led to the development of appropriate solutions. For instance, the 24-hour dietary recalls indicated that families generally had adequate energy intakes, but low fat intakes, which could be addressed by increasing consumption of ASF, a pattern that is consistent with other areas in the rural Andes. Findings from the initial studies indicated that improving chicken rearing would be a viable option in the *Cabecera de valle* communities, because there is adequate production of grains that can be used to feed the hens. In the *Puna* communities, meanwhile, the lower temperatures that come with higher altitude, and poor soil quality, make it difficult to grow grain for poultry feed. Thus, it was decided to focus on improving sheep husbandry in these communities. The study findings and proposed solutions were shared with the communities, and there was near universal agreement amongst participating households that the solutions were appropriate for improving food security and nutrition. Due to the unique nature of the chicken and sheep interventions, their achievements have been described separately in the following section.

Chicken Communities (Cabercera de valle)

The chicken husbandry practices implemented in the communities encompassed the care and housing of chickens, providing their food, caring for their health and ensuring adequate levels of reproduction of the flock. The intervention began in two communities in September 2013 and expanded to three other communities in December 2013, and then sixteen additional communities in 2005. A total of 329 households and 3 schools participated in the chicken intervention. Approximately 50% of children in the schools were members of families already participating in the project. Participants received a sheet of corrugated zinc, to serve as the roof of the chicken coop, which was constructed out of the zinc and local materials. After the chicken coop was constructed, they received 5 to 10 chickens which had been vaccinated against Newcastle disease as a starter flock. Prior to the project, there was little knowledge in the communities about appropriate breeds for chicken rearing. The project selected two main breeds – "Creoles" and "Pachucas". The Pachuca hens are good egg producers, but they do not brood and hatch the eggs. Creole hens, meanwhile, are good brooders. Thus, the project families were given both Creole and Pachuca chickens in the starter flock.

Following introduction of the starter flock, one to six chicken rearing training workshops were carried out in each community (average of 3.6 workshops per community) to train the participants on chicken feeding, breeding, and disease and pest management. Families were also provided with teaching materials, such as brochures, to supplement the workshop training. In the schools, caring for the chickens was the joint responsibility of education committees, community organizations, children and teachers. In the pilot communities, the project attempted vermiculture as a means of producing chicken feed (worms) from manure, but it was unsuccessful – low ambient temperatures led to very slow worm reproduction, and the worm beds required constant care to keep the levels of moisture in the proper range. The farmers were not interested in continuing the vermiculture and it was dropped from the intervention. However, chicken feed is naturally found in fields after harvest and in disturbed soils where insects lay their eggs, so families let their hens roam in the fields to hunt and eat these insects.

The uptake of the chicken intervention was evaluated through project records and field staff observation during visits to participating households. During these visits, field staff also assessed participants' knowledge and understanding of the techniques for chicken coop construction and chicken rearing (**Immediate Outcome 1120**). Participants were taught how to use the two breeds (Creole and Pachucas) for egg production. Families had to identify the fertilized eggs, and place them in the nest of the Creole hen for brooding. This would ensure that enough eggs were hatched for reproduction of the chickens as well as for egg production. By the end of the project, 100% of participating families understood the qualities of the two chicken breeds and how to use the combination of "layers" and "brooders" in their chicken rearing system.

As shown in Table 2 below, the project was successful in increasing the number of chickens per household from 1.5 to 6, and increasing egg production from 0.7 eggs to 4 eggs per day in participating households.

Table 2: Performance achieved in increasing egg production in participating communities

Baseline	Target	Performance Achieved
1.5 chickens per household	8 chickens per household	6 chickens per household
0.7 eggs per day	6 eggs per day	4 eggs per day

Sheep Communities (Puna)

The sheep husbandry practices aimed to increase the amount of sheep meat that can be consumed by the families. The initial baseline studies on the "flow" of meat and the animal carrying capacity of the land determined that the improvement of sheep management practices could increase the average number of sheep per family from 63 to 66. The intervention began in two communities in July 2013, and expanded to two additional communities in October 2013. One of the pilot communities (Challa Grande) dropped out due to very low participation from the families. The project team suspected that this community had grown accustomed to NGOs distributing "gifts" and then leaving, making it very difficult to engage them. In total, three communities and 65 households participated in the sheep intervention. Participating households received a sheet of corrugated zinc to construct the roof of the corrals, which was constructed out of the metal and local materials (adobe bricks and/or stones).

In addition to the provision of the sheet metal, between 5 and 8 training workshops were carried out in each community (average of 6) to train the participants on improvement of the sheep corrals, animal nutrition, animal health and breeding. Prior to the project, sheep corrals in the communities did not have roofs, so the animals were unprotected from the weather. The project supported the construction of corrals with appropriate walls and a sloping roof. The sloping roof protected the animals (especially new born lambs) from the rain, snow and hailstones, while at the same time, preventing accumulation of water during the raining season and allowing entry of sunlight to help control pests and diseases. Assessments done at the end of the project indicated that 100% of participating households understand the technology and appreciated the value of the improved corrals (**Immediate Outcome 1120**).

A major problem in raising animals in the *Puna* region is the lack of forage for animal feed during the dry season (October to December). The project helped to mitigate this through training on improving forage production and conservation. To enhance forage conservation, the project helped to revive the traditional strategy of rotational grazing, which consists of systematically transferring herds to areas of

higher forage availability. Prior to the project, this practice was not conducted frequently and it was done at the individual rather than the community level. Additionally, forage production was enhanced through pilot plots of fodder, initiated with 8 families, to serve as complementary food for sheep. The plots consisted of oats (two varieties) and a shrubby species of buckthorn. One of the plots performed well, and proved to be highly palatable for the animals, and therefore could become a significant nutritional contribution during the dry season. The results were shared with all families in the sheep communities. Assessments conducted by project staff indicated that approximately 80% of families in the sheep communities have better knowledge of improved fodder management practices (**Immediate Outcome 1130**).

In regards to the achievement of Intermediate Outcome 1100 (increased production of meat or eggs in participating communities), the project aimed to increase flock size from an average of 63 to 66 per household. Unfortunately, the team was not able to collect data on the average number of sheep per household at endline. However, observations from farmers indicated that the improved corrals resulted in higher birth rates and lamb survival increased to nearly 100% - two factors which are necessary to increase flock turnover and harvest rates.

Acceptance of New Animal Husbandry Practices:

Findings from focus groups and informal conversations indicated that all families involved in the project accepted the idea of the new animal husbandry practices. A more detailed assessment of families' perceptions of the value of the intervention was conducted in the chicken communities at three workshops in August and September 2015 and is summarized in Table 3. The families valued the eggs (and to a lesser extent, the meat) as a source of good food, the production was relatively easy to get started and maintained, and the families were happy about how the chicken rearing fit into their life. On the other hand, they would have preferred more eggs and better meat, and there were some production problems. The general consensus was that the families will continue with chicken rearing after the project has finished.

Table 3: Participants' perceptions of the positive and negative aspects of the chicken intervention

Themes		Positive and Negative Aspects	Workshop 1	Workshop 2	Workshop 3	Sum
Food source	Positive	More eggs	4	5	5	54
		Good food for the kids	5	5		
		A meat substitute		5	4	
		Better intellectual development	3		5	
		A source of meat			5	
		Natural food		4		
		Food for women	2			
		You can make different foods from eggs		2		
	Negative	Times of no egg production	2	2		11
		Chicken meat is tough	4			
		Eggs are only for kids	3			
Production	Positive	There are no illnesses		4	5	23
		Better production			5	
		It is easy to feed chickens			5	
		The chickens grow well in the open air			4	
	Negative	The first hens were weak	5		2	41
		Too many roosters in initial supply		2	3	
		The chickens damage the crops	5	3	2	
		They require more wheat and other grains	3	3	3	
		The hens eat their own eggs	3		3	
		Illnesses			3	
		It is difficult to move the chickens to the hill location during the pasture season			1	
Chicken coops	Positive	The chicken coops protect the chickens from predators	5	4		14
		The chicken coops are easy to construct			5	
	Negative	It is difficult to make the chicken coops			4	4
Family	Positive	Happy children	5		5	14
		Everyone has a role			4	
Guano	Positive	Guano is good for crops	3	3	5	11
		TOTALS				
		Number of positive aspects	7	8	12	17
		Sum of positive aspects	27	32	57	116
		Number of negative aspects	7	4	8	10
		Sum of negative aspects	25	10	21	56

Outcome 1200: Increased intake of meat or eggs among women and children and improved child feeding practices in participating communities

Two immediate outcomes contributed to achieving this intermediate outcome:

- 1210 Increased knowledge amongst men and women of the importance of consuming meat and/or eggs, particularly for women and children; and
- 1220 Increased knowledge amongst men and women of improved child feeding practices.

In this section, we will first discuss results related to nutrition knowledge, followed by results related to intake of meat and child feeding practices.

Nutrition Knowledge

To increase knowledge on the importance of meat and egg consumption, and appropriate child feeding practices, the project team conducted 1 to 6 nutrition education workshops per project community (average of 5), and regular discussions on the subject were conducted during household visits. A thematic calendar promoting the importance of ASF was also distributed in 15 communities. Nutrition promotion activities targeted at both direct and indirect communities in the Andean Zone of Cochabamba included 4 radio programs on nutrition promotion, and a Learning Exchange conducted between Tapacari communities (project beneficiaries) and communities of Northern Potosi.

Men's and women's knowledge of the nutrition and child feeding concepts was assessed through Focus Group Discussions. At baseline, most men and women thought of "nutrition" as relating to fruit and vegetables, and did not think of meat or eggs as a source of protein or fat. Findings from the focus group discussions indicated that at endline, approximately 90% of men and women know the importance of eggs and meat in children's diet. Furthermore, at the beginning of the project, men and women had many erroneous perceptions about breastfeeding. For example, many parents believed that if they give the newborn child breast milk (colostrum) immediately after birth, then those children will not be able to endure hunger later in life. This is contrary to strong recommendations to breastfeed immediately following birth. Some parents believed that the newborn child should be given tea, urine or water. At the end of the project, results from the focus groups indicated that most men and women understood the recommended practice of breastfeeding immediately following birth.

Intake of Meat and Eggs

Consumption of meat and eggs was measured through two main indicators: (1) % of dietary energy from animal source foods (ASF), and (2) % of children and women who consumed meat, dairy or eggs in the last 24 hours. Overall, the percentage of dietary energy from animal source foods (ASF) did not change meaningfully in children (from 11% to 12%) and doubled in women (from 6% to 12%) (see Figures 8 and 9). However, when we look at the two intervention communities separately, we see that the percentage of dietary energy from ASF increased in children in the sheep communities and actually decreased in children in the chicken communities. The project team does not know why this reduction occurred in children in the chicken communities. In the chicken communities, the project worked towards improving diets principally through increasing production and consumption of eggs. But, as is true in any study, the promoted changes in the diet take place (or not) against an ever-changing landscape of dietary changes due to changes in harvests, markets, employment, food preferences and other unknown factors. Although egg consumption increased in children in the chicken communities it may be that the increase was not enough to offset other changes in the diet (such as seasonal, annual, secular and random changes).

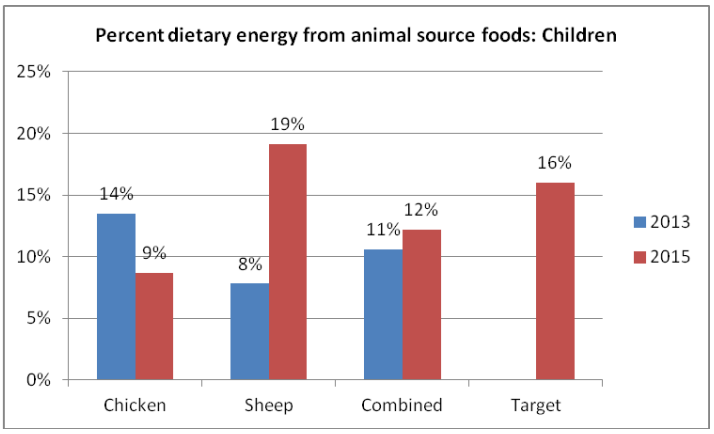

Figure 8: Percent dietary energy from animal source foods: Children

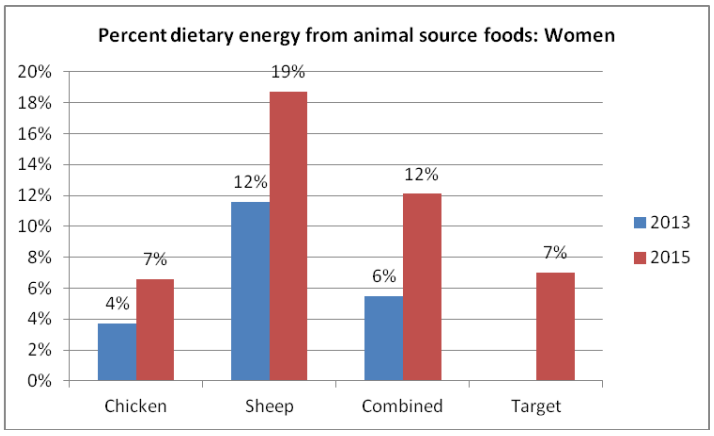

Figure 9: Percent dietary energy from animal source foods: Women

In the chicken communities, as expected, egg consumption increased in both women and children (see Figures 10 and 11). Detailed findings, including those for men, are shown in Table 4. The percentage of children, women and men who had consumed eggs daily increased significantly (p<.0001), surpassing the target of 60%.

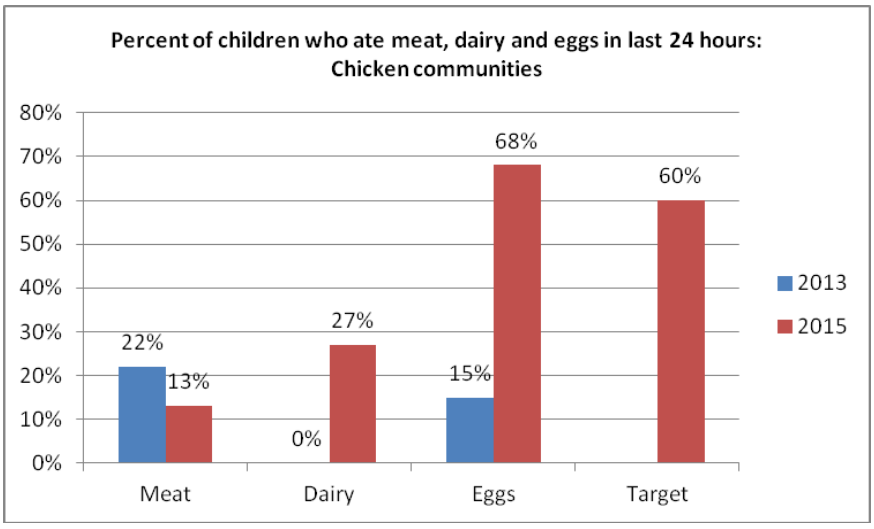

Figure 10: Percent of children who ate meat, dairy and eggs in last 24 hours: Chicken communities

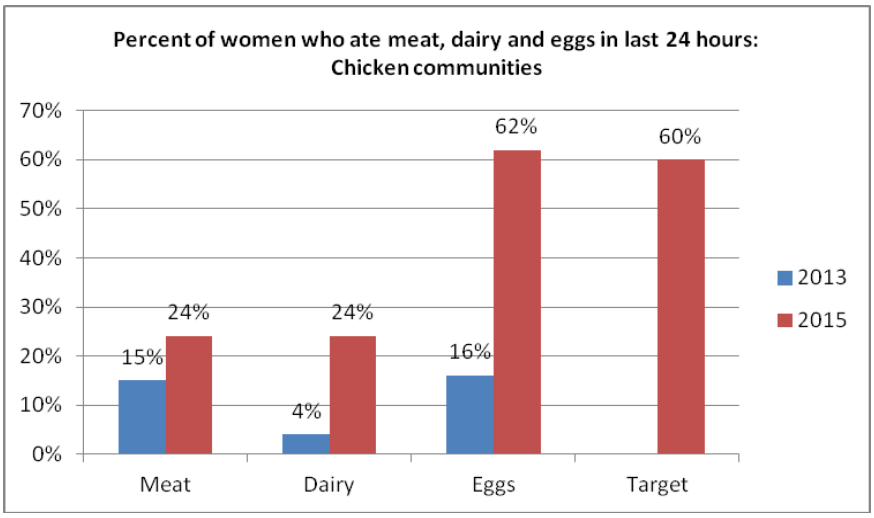

Figure 11: Percent of women who ate meat, dairy and eggs in last 24 hours: Chicken communities

Table 4: Egg consumption in children, women and men

	Baseline	Endline	p
children 0.5 to 5.99 yrs			
n	65	19	
% who ate eggs in last 24hours	15	68	<.0001
average (±SD) egg intake (g/day)	7 ± 22	33 ± 22	0.0002
adult females (18 years +)			
n	127	29	
% who ate eggs in last 24 hours	16	62	<.0001
average (±SD) egg intake (g/day)	6 ± 19	33 ± 34	<.0001
adult males (18 years +)			
n	110	29	
% who ate eggs in last 24 hours	14	66	<.0001
average (±SD) egg intake (g/day)	6 ± 21	39 ± 34	<.0001

As shown in Table 4, above, the average egg intake per day also increased significantly from about one tenth to about half an egg per day (eggs produced in the area weigh about 60 grams). This indicates that not only were more women and children consuming eggs daily, but they were also consuming greater amounts of eggs on a daily basis. Subgroup analysis demonstrated that individuals in families that were involved in the chicken intervention for two years had higher intakes (average of one egg per day) than individuals in families who were in the intervention for only one year (average one-third egg per day). This is reasonable as it takes time for the flock to get established and for farmers to start to improve chicken care practices.

In the sheep communities, as expected, meat consumption increased in both women and children (see Figures 12 and 13). Our endline results indicated that 83% of children and 93% of women consumed meat daily, surpassing the target of 60%. On the other hand, dairy consumption decreased slightly in women and children, counter to the project's expectation. Qualitative findings indicated that sheep milk is only utilized by families when the lambs die. When lambs survive they consume most of the ewe's milk, leaving very little for collection from families. The improved sheep management practices implemented by the project resulted in more lambs surviving, and consequently, reduced availability of milk. Thus, the slightly decreased dairy intake was an unintended consequence of the project's success with sheep management.

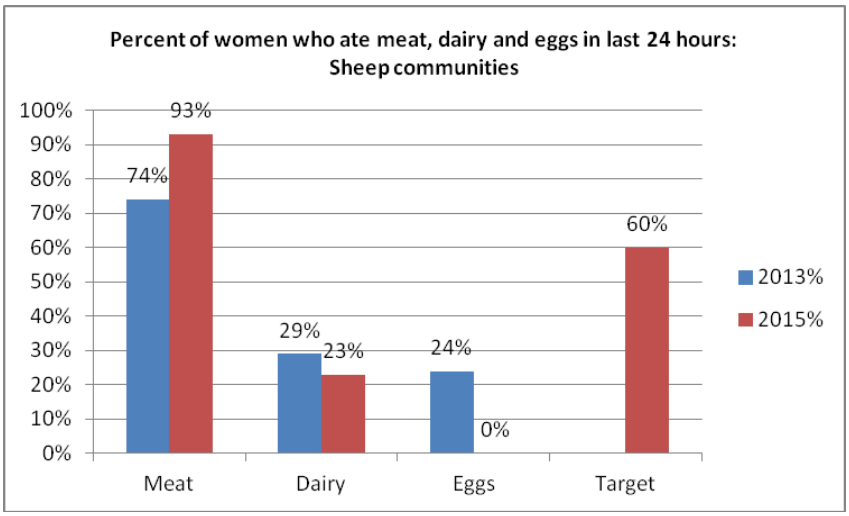

Figure 12: Percent of women who ate meat, dairy and eggs in last 24 hours: Sheep communities

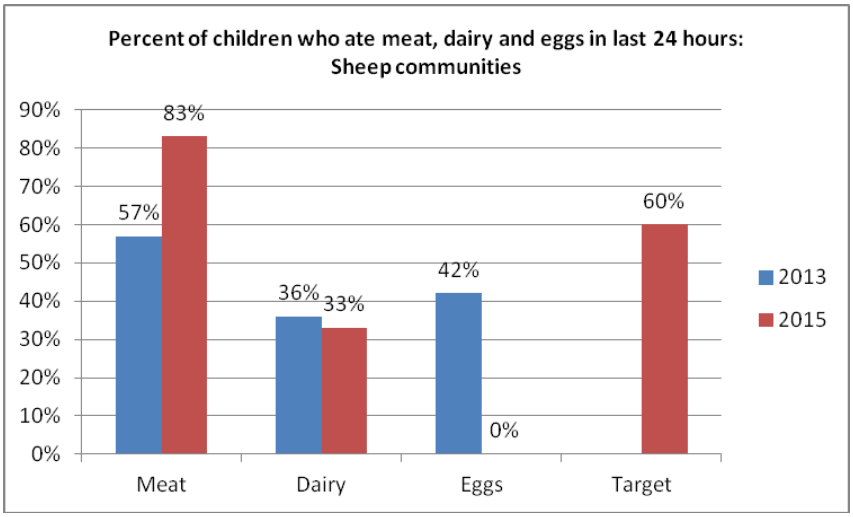

Figure 13: Percent of children who ate meat, dairy and eggs in last 24 hours: Sheep communities

Child Feeding Practices

Child feeding practices were assessed through dietary diversity, meal frequency and breast feeding practices. Results for dietary diversity showed an increase daily consumption of 5 or more food groups, increasing from 70% to 81% in children and 70% to 79% in women. Unfortunately, meal frequency was not assessed at endline and the project was not able to assess breastfeeding practices at endline due to the small number of children in this age category. However, as described above, qualitative findings indicate that the majority (90%) of men and women understood appropriate breastfeeding practices as a result of the training provided through the project.

Outcome 1300: Improved decision-making authority of women relating to animal husbandry practices and use of family resources in participating communities.

The project assessed women's decision making authority around access to food produced, and the extent to which men and women used shared decision making around use of the food produced through the interventions. Two immediate outcomes also contributed to this intermediate outcome:
1310: Increased acceptance among both men and women of the importance of shared decision making to increase meat and egg availability and improve family nutrition.
1320: Increased willingness of men to share animal husbandry practices and household/child feeding responsibilities in a complementary manner.

A study on gender dynamics conducted at the project start revealed that decisions made related to agricultural production and use of food produced (whether for consumption or sale) are made jointly by men and women. The purchasing of foods from the market (mainly rice, noodles, sugar, oils and vegetables) is also shared by the couple. Women are typically responsible for purchasing oil, fruits and vegetables (purchased in small quantities), while men buy rice, sugar and pasta (purchased in larger quantities). In these communities, it was noted that women were not only part of agricultural and livestock work, they are also involved in decision making in the planning and organization of production.

That said, although decisions about food use were made jointly, most men and women did not understand that the main food deficiency in families was related to low consumption of meat and eggs, as they associated good nutrition with fruits and vegetables. Thus, the project worked to maintain the spirit of dialogue and shared decision making while also conducting nutrition education on the importance of meat and eggs for women and children's nutrition. Workshops were conducted using a gender perspective, reflecting on the importance of shared responsibility for child feeding and relating this to intellectual and physical development of the child.

Findings from the endline evaluation revealed that the spirit of shared decision making has been maintained by the project, and around 90% of men and women now understand the importance of meat and egg consumption for children **(Intermediate outcome 1300)**. Families became more aware that child feeding should not be an isolated task, and support from both parents is important. Men, in particular, are now more engaged in child care, they enter discussions about child care, and they know the benefits of good child feeding practices **(Immediate Outcomes 1310 and 1320) .**

In terms of gender roles and sharing of responsibilities, the baseline gender study found that, in terms of farming activities, responsibilities were distributed between men and women in a complementary manner. In the purely agriculture-based *Puna* communities (sheep), preparation of food and child care is shared between men and women. Conversely, in the *Cabecera de valle* (chicken) communities which

have significant employment in mining, child care and other domestic activities are primarily the responsibilities of women, as men work in the limestone mines and usually arrive home late. Caring of animals is the responsibility of women (mothers and daughters), while men are responsible for construction of the chicken coops and sheep corrals. Women feed the animals, take them to pasture and are more involved in disease control activities, although men also help in these tasks. Children also participate in all activities, helping their parents while at the same time learning practical skills. In some communities, men also migrate for work between June and August, and during this time period, there is increased workload for women.

The project aimed to maintain the sharing of responsibilities in a complementary manner in the beneficiary communities. Project activities engaged both men and women in the training workshops, daily interactions, and farmer to farmer sharing of experiences. Experience exchanges between farmers in the pilot communities and those in the scale-up communities emphasized the sharing of responsibilities between men and women. The families in the pilot communities shared their experiences regarding management and breeding of animals and sharing of responsibilities between men and women in terms of animal husbandry and child feeding. Through using this approach, we found that families were able to maintain the complementary distribution of roles between men and women **(Intermediate Outcome 1320).**

6. Project Management

6.1 Governance

This project was implemented by HealthBridge in strategic alliance with CENDA. HealthBridge was responsible for the overall management of the project and the final preparation of technical and financial reports to DFATD. HealthBridge also provided technical assistance to CENDA on topics related to nutrition, and were actively involved in nutrition data management and analysis.

CENDA was responsible for the day-to-day implementation of the project and relationship with beneficiaries. CENDA's Director and Executive Board monitored the technical and financial aspects of the project, and were ultimately responsible for the project execution. The Field Project Manager was responsible for implementation of planned activities, in addition to maintaining a close relationship with beneficiaries. The project nutritionist, who was also a specialist in rural development, led the nutrition promotion activities throughout most of the project. However, in the later stages of the project, the nutritionist's work was taken on by the rest of the project staff as one means to cope with the financial

shortfall caused by variations in the exchange rate between Bolivianos and Canadian dollars. An Agronomist led the activities related to improvement of animal husbandry practices and was supported by external consultants including a livestock specialist and an agricultural specialist. Field assistants assisted with implementation of all project activities in the field. The team also had the continuing support of an administrator who was responsible for the administrative aspects of the project, and a driver.

6.2. Work Planning and Logistics

The local project team held weekly coordination meetings for monitoring project activities, as well as monthly planning meetings. Every three months, institutional monitoring of all CENDA's project was carried out. For close coordination with HealthBridge, HealthBridge staff visited once or twice per year and communicated regularly by email and Skype.

Annual Work Plans were developed at the beginning of each Fiscal Year. The first planning meeting between HealthBridge and CENDA was held in October 2012, with the intention of working in 20 communities with 1,000 families by June 2015. However, CENDA later determined that the census data used to set these targets was out of date. Due to migration from rural to urban areas, rather than 50 households per community, there was only an average of 20 households. Consequently, reaching 20 communities would reach only approximately 400 households. In November 2014, the project requested a no-cost extension (NCE) so that we could extend our reach to 25 communities and reach 500 households. DFATD (now GAC) approved the NCE.

To reach the communities, the project team had access to three 4-wheel drive trucks to access the communities, which were a 3 to 8 hour drive from CENDA's office in Cochabamba. As the project was implemented in two provinces, there were often times when project team members travelled separately. While the project had resources to cover a driver 50% of the time, some of the project staff also served as drivers. The communities provided staff with overnight accommodation at their community offices or schools. The project also rented housing in two intervention communities. Two computers were purchased, while the rest of the equipment (such as cameras, voice recorders, GPS's) was provided by CENDA.

6.3 Project Monitoring and Reporting

At the project start, a Logic Model and PMF were developed which defined the expected outputs and outcomes, and identified indicators to monitor project success. The PMF and Annual Work Plan were the main tools used for project monitoring. The PMF was reviewed, adjusted and updated annually, according to the project context, ensuring that activities were aligned with the expected results.

Technical monitoring of the project was done through a six-monthly reporting system as well as regular email and Skype meetings held throughout the project. This worked well to capture progress made in the activities, as well as regular assessments of challenges, opportunities and project risks. Financial monitoring of the project was done through HealthBridge's quarterly financial reporting system. The financial reports were reviewed by the Project Manager to assess reasonability of the expenses in comparison to activities, and a comparison between forecasted and actual expenditures was done each quarter.

6.4 Public Relations

CENDA worked very hard to establish and maintain proper relationships with the communities. At the beginning of the project, meetings were held with communities' parent organizations, including the Council of Ayllus and Marcas of Cochabamba. These meetings helped to identify which communities may be interested in the project. Similarly, meetings were held with the Municipality of Tapacarí in relation to agricultural issues. To maintain close relationships with participating communities, CENDA would share about the project achievements and activities in communal meetings, community workshops and through meetings with individual families.

Relationships were also maintained with local institutions, including Health Centres, the Municipality of Tapacarí, local government structures, education centres and schools, and with Radio Andina, among others. CENDA staff coordinated activities with these local institutions, as relevant, throughout the project implementation. For instance, project staff coordinated with local Health Centres to raise awareness about appropriate breastfeeding practices.

7. Risk Management

A detailed Risk Register is shown in Annex C. Risks were monitored throughout the project's six-monthly reporting system and through regular e-mail and Skype conversations. New issues were added over the course of the project and response strategies were developed collaboratively by HealthBridge and CENDA. For instance, the project did not anticipate the problem of migration from rural to urban areas, nor the difficulties created by previous NGOs who worked in the communities. Changes in CENDA leadership, an unforeseeable risk, also occurred during the project. Below we discuss risks identified at the project start and throughout implementation.

Operational Risks

- *Goal of reaching 25 communities may not be met:* At the project start, we had aimed to reach 20 communities. This was later revised to 25 communities after realizing (as explained in section 6.2), that there less households per community than originally anticipated (~20 instead of 50) and therefore the project would need to work in more communities to reach more households. Nonetheless, the risk of not reaching the targeted communities was present throughout implementation. Up until 2014, the project was working in only 8 communities. However, through building on the existing interrelationships between communities and emphasizing farmer to farmer sharing of experiences, the project was able to recruit an additional 17 communities to reach the target of 25 communities. The 6 month NCE also allowed the project team to achieve this goal.

- *Traditional control of household financial resources and decision making authority by men may result in meat and eggs being sold rather than consumed by the family:* Findings from the baseline assessment revealed that men and women already shared decisions about the use of food by the household. The real risk was that neither men nor women understood the importance of meat and eggs for family nutrition. The project team addressed this risk through engaging both men and women in nutrition promotion activities, focusing on the importance of ASF consumption for the intellectual development of children. As men and women learned about the importance of ASF, they did not sell the meat or eggs produced by the project interventions.

- *High rates of migration from rural to urban areas and the resulting "double residence" may lead to reduced participation in the project activities if families are often away.* This risk did occur and was difficult to manage. Agriculture is the only livelihood option in the rural communities, and families need to migrate to find work to generate additional income. To minimize the impact, the project often combined workshops and training with regularly held community meetings, in which there is regular participation of families. Even with this, few families participated 100% in all project

workshops. CENDA staff expended much effort to conduct household visits to families to ensure they received sufficient technical support.

- *High levels of poverty in the area, a large NGO presence, and NGO practices of only giving gifts to beneficiaries, have led to expectations from families to only passively receive gifts from the project.* This risk was very present at the beginning of the project, despite the discussions held by the project staff on the project objective to implement sustainable solutions. Many families were only interested in the delivery of materials for the corrals and coops, and the animals. The project team mitigated this risk by focusing on nutrition promotion, and reflecting on the importance of ASF for child development, before delivery of materials to the community. This way, by the time materials arrived to the communities, families were more interested in using them in the appropriate way that was being advocated by the project.

- *Annual changeover in community leadership created the risk that new authorities do not support the project:* This risk was minimized by project staff establishing trusting relationships and friendships with most community members, so that virtually all members were aware of the project objectives. This provided continuity to the activities despite changes in leadership. Therefore, this risk never resulted in any problems for the project.

- *Changes in CENDA leadership and Advisory Board may lead to personnel re-organization:* Changes in CENDA leadership did occur on two occasions during the life of the project, creating a potential risk to project continuity. Fortunately, these changes did not lead to significant changes in project staff and had no real impact on the project. The new Director and Advisory Board supported continuity to the project activities.

- *Infrastructure (materials) for poultry houses being used for other activities*: There was a concern that families may use the materials provided for chicken coops for other purposes, such as storing grain. The risk was higher amongst beneficiary families who did not participate in the entire process of reflection with regard to the importance of ASF. After learning lessons with the pilot communities, the project team conducted nutrition promotion before delivery of the materials in the expansion communities, and ensured that families verbally agreed to use the materials as the project intended.

Financial Risks

HealthBridge was able to raise funds to meet the fundraising requirements of the project. The main financial risk that occurred during the project, as mentioned earlier, was the reduction in the Bolivianos-Canadian dollar exchange rate. The drop in exchange rate meant that the money CENDA received in the local currency at each disbursement was less than expected. CENDA mitigated this by reducing some

activities, reducing staff and retaining only the minimum staff required, and seeking small amounts of additional funding to cover expenses so that essential project activities were not compromised.

Development Risks

Risks related to climate change interfering with the families' ability to raise animals was not realized during the project. Risks related to political instability, however, did occur and did threaten the project. In December 2013, a Danish NGO was expelled from Bolivia and the national government threatened to shut down all NGOS that do not follow the line of government, particularly in matters related to environmental activism. In August 2015, CENDA was put on a list of "irregular" NGOs for not completing required paperwork (which had in fact been completed). This created a delicate situation for NGOs and threatened the operation of CENDA. In the end, the government did not follow through with their threats to shut down NGOs and CENDA's status was "regularized". Having good relations with the beneficiaries helped to maintain continuity throughout this difficult time. While the communities did support political campaigns, it did not influence the main project activities, as originally feared.

Reputation Risks

The risk that Canadian stakeholders may not publicly support the program did not occur.

8. Crosscutting Themes and Priorities

8.1 Report on Implementation of Gender Equality Strategy

At the project outset, three main gender equality issues were anticipated: (1) Animal husbandry is typically a women's responsibility which may increase labour burden on women and take them away from other responsibilities such as child feeding and care; (2) Women lack decision making power with respect to distribution of food and whether it is used to improve the family's diet or sold as a commodity; and (3) Limited literacy hinders women's ability to access and understand information about nutrition. Two main strategies were envisioned to address these issues, including (1) Engaging men in all aspects of the project, and (2) Integrating participatory nutrition education.

The baseline assessment on gender dynamics identified that men and women share decisions related to agricultural production and distribution of food. However, neither men nor women understood the importance of consuming meat and eggs for family nutrition. In terms of gender roles and responsibilities, the assessment found that farming activities were equitably shared between men and women. Child care, food preparation and other domestic tasks, meanwhile, were primarily the

responsibility of women and older daughters; although, men did share in these tasks in some communities (particularly the *Puna* communities). In the *Cabecera de valle* communities, men migrated for work between June and August, which meant that women shouldered most of the responsibilities during this time period, with help from their children. Limited literacy was also identified as an issue in the communities, so project team delivered information orally through participatory workshops and household visits.

Given these findings, the project endeavoured to maintain the spirit of shared decision making and the complementary distribution of gender roles, ensuring that neither women nor men become overburdened with the new tasks. This was achieved using the strategies of engaging men and conducting participatory nutrition education. As these strategies were integrated and were not done in isolation, we have described them together, below.

Men (and women) were engaged in all project workshops and activities. There was a particular focus on increasing men's sense of responsibility for child feeding, as this was typically a task assigned to women. Also, recognizing that members of the community may be tempted to sell the food produced for profit, the project team incorporated participatory nutrition education on the importance of ASF for child development. In the workshops, there were spaces for reflection which focused on the dreams that parents have for their children. The dreams of the families were often that the children have access to better education. Building on this, project staff shared about the importance of healthy nutritious food, especially ASF, for the intellectual and physical development of children. This reflection led to parents (including men) having more interest in providing good diets for their children. It was also discussed that feeding children is something fundamental, so it must be shared by men and women.

In order to minimize the risk of overloading the animal husbandry tasks on women, and therefore jeopardize their role in child care and feeding, the project team identified men in the communities who shared responsibilities related to food production, breeding of small animals and child feeding to serve as role models for other men. The men were invited to the workshops to share about their experiences in order to motivate other men to also assume a leading role in animal management and child nutrition. Given the importance of the breeding of domestic animals to serve as food for their children's diets, the men understood that they should also have an active role in the breeding and care of animals, as well as helping with child feeding and other domestic tasks.

In addition to the workshops, project staff conducted follow-up visits at participants' homes in order to discuss about how the intervention was progressing and to reinforce information about the benefits of ASF and the importance of shared responsibilities for animal management and child feeding. For cultural and social reasons, women's active participation in community spaces is limited. Although many women attended the project workshops, some women did not, so these home visits also provided a way to

ensure that information reached all of the women. The project team found that, in many cases, it was easier to converse with beneficiaries in their homes and through informal talks. Through these discussions, it became clear to the project staff that the beneficiaries cared deeply about the project interventions and wanted them to be successful.

Overall, the project was successful in maintaining shared decision making about agricultural production and food consumption, and increasing men's knowledge and involvement in ensuring that children (and women) consume a healthy diet that includes ASF. For the most part, responsibilities were shared equitably within the family. The CENDA and HealthBridge experience in this project has shown that men are open to changing their traditional roles when they understand the benefits for their family and children.

8.2 Environment

The soil-building properties of animal manure are well-known and highly prized, reducing the need for chemical fertilizers. The project team proposed that manure from chickens and sheep be used for food production. In participatory evaluations carried out at the community and regional levels, families confirmed that using manure was beneficial for agriculture, since it preserves and improves the quality of the soil. Healthy soils retain water better, which increases the production and conservation of water resources.

However, a limiting factor for raising animals in this environment was ensuring adequate food for the animals, which in turn requires management of scarce rain and water supplies, and the efficient use of land to produce fodder crops. Therefore, the project implemented agroecological practices of fodder production and conservation. Without a doubt, the most important factor for proper management of fodder were reflections and actions to improve the management of communal lands such that the land was given adequate fallow time to allow soils to recuperate. Toward this end, experiences were shared between communities through processes of participatory reflection.

8.3 Governance

CENDA was able to build strong relationships with the communities through participating in regular communal meetings and sharing about the project activities and achievements. They coordinated project activities with related institutions, such as local Health Institutions and educational centres, which not only enhanced community relationships but also strengthened the impact of the project

messages. Additionally, the household visits to individual families also contributed to CENDA's strong and positive reputation in the communities.

Government animosity towards NGOs, following the expulsion of a Danish NGO, did threaten CENDA's ability to work in the area at one point during the project implementation. However, the good relationships built with the beneficiary communities helped carry the project through this difficult time and maintained local continuity and commitment to the project interventions. The strong community engagement built local ownership of the interventions and will facilitate their sustainability beyond the project timeframe.

10. Success Factors

10.1 Relevance

Most of the communities in the Andes region are deficient in consumption of fats and other nutrients. The project's chicken and sheep interventions aimed to increase the availability of foods with high fat and nutrient content by increasing availability of ASF.

Sheep breeding is a traditional activity in the beneficiary communities, and knowledge of traditional practices has been passed down through many generations. The study aimed to strengthen knowledge about traditional sheep breeding practices and stimulate spaces for reflection on how to improve and optimize these practices to improve food availability.

In the chicken communities, some families were already raising chickens prior to the project, and they saw the project as an opportunity to improve their chicken rearing techniques. Other beneficiary families who did not have experience with chickens also recognized the benefits of this opportunity to start raising chickens. Families were aware that chicken rearing is a feasible activity in the region, given that the region has good cereal production (mainly wheat, barley and corn) and there are forage crops that occur naturally.

10.2 Appropriateness of Design

The project approach to addressing animal husbandry practices was focused around four themes: infrastructure of the shelter, animal nutrition, animal health and animal reproduction. This has allowed the families to follow the process of development and enabled them to contribute their own knowledge to the process and provide feedback.

The design of the shelters in chicken and sheep interventions were adapted to the materials available in the community, and the project only donated materials that were difficult to access for the families and are very long lasting (sheet metal for roofing). The feed for chickens and sheep was well suited to the conditions in the area, namely production of grains in *Cabecera de valle* and fodder in the *Puna* region. Similarly, the decision to work on sheep husbandry in the *Puna* communities (as opposed to chickens) was based on the low availability of grains and the fact that the region has adequate land carrying capacity for sheep.

The design of the nutrition promotion interventions was based on the communities' reflections on the dreams that families have for their children. Most families expressed wanting their children to complete primary school studies and continue into secondary school. This reflection concluded that to improve children's cognitive capacity, it was necessary to have a better diet that includes sufficient fat and other nutrients, which could be provided by ASF. This approach was appreciated by the families.

10.3 Sustainability

Participating families' capacity to carry out animal husbandry was strengthened through workshops and hands-on learning techniques. These families are now able to spread what they have learned to other families, and thus are not dependent on outside technical specialists to continue spreading the interventions.

To enhance sustainability, the project promoted animal feed that can be produced locally. Similarly, for preparing medications for controlling animal diseases, the project prioritized strengthening and spreading local practices that use local inputs, or natural external inputs that can easily be obtained in the market.

Working with local schools, in addition to individual households, has also strengthened sustainability as many of the children in the schools were members of beneficiary families. This has strengthened the nexus of mothers, fathers and children who are skilled in the animal husbandry techniques, and promoted a process of knowledge and learning within the families. The children acquire knowledge and skills from their parents, and this ensures the children have sufficient skills to start similar endeavors in the future.

10.4 Partnership

The entire project was implemented in direct partnership with the local beneficiary communities. Prior to working with the communities, CENDA engaged local authorities to share the project details and

obtain their approval. Once the authorities saw the relevance of the project to their community, arrangements were made to engage the local community members at their regularly scheduled community meetings.

The intervention began with a community decision that the community as a whole will be the main actor in the project. To engage the local community members, CENDA emphasized how the project would help to improve child nutrition and development, as well as the health of the whole family. This approach was successful because families consider child nutrition to be a key issue. A participatory process was used to ensure that community members were involved and able to contribute their own knowledge and experience in designing the chicken and sheep interventions. Some factors in the interventions, such as improving land management for better forage availability, required community-level decisions and teamwork, which is why it was imperative that the whole community was on board.

The partnership between HealthBridge and CENDA also contributed to the success of the project. The two organizations served complementary roles and each brought unique strengths to the project. HealthBridge had prior experience with Results-Based Management and DFATD's technical and financial reporting systems, and was able to provide support to CENDA with these processes to ensure all requirements were met. HealthBridge also provided expertise in nutrition promotion and nutrition research methods and provided technical support to CENDA on these aspects of the project. CENDA brought a wealth of knowledge and experience working with rural families in the Andean region, which was a key factor contributing to the establishment and maintenance of relationships with local stakeholders.

10.5 Innovation

To improve ASF in the project communities, a combination of existing and innovative techniques were introduced or strengthened to improve animal husbandry practices. On the theme of sheep husbandry, the key innovation was the addition of roofs to the corral infrastructure, which protected the animals from the elements and resulted in decreased sheep diseases and deaths (mainly in the offspring). In the case of chickens, the project identified specific breeds and rearing techniques to optimize egg production. In addition, the chicken coops protected the chickens from predators, reducing death rates. Families also gained a better understanding of the importance of animal nutrition and of locally availability foods and practices to meet nutritional needs. For example, using ground eggs shells to add calcium to chicken feed, or allowing the chickens to graze on the farms where they can hunt and consume worms (providing protein).

In terms of animal health, the innovative aspect of this project was the promotion of locally available techniques and inputs for preparation of medication. Some agriculture-related public institutions have

introduced conventional veterinary drugs, which led to losing many local practices and generating a dependency on external inputs and technical experts.

Perhaps the most innovative aspect of this project was the integration of nutrition promotion with the animal husbandry interventions. Through analysis and reflection in the nutrition training, families have changed their vision in relation to the use of farm products, particularly eggs. Before the project, families who reared chickens sold most of the eggs produced for profit. Now, the families prioritize the eggs for consumption by the family for the nutritional benefits.

10.6 Appropriateness of Resource Utilization

HealthBridge's quarterly financial reporting system ensured that resources were utilized appropriately throughout project implementation. The system captured actual versus planned expenditures and enabled regular monitoring of project spending and discussion about variances. All financial reports and forecasts were reviewed in conjunction with narrative reports and workplans. As needed, financial planning was discussed through Skype and email, and during in-person visits, to allow for clarification and for team decision making about project spending.

This close monitoring between HealthBridge and CENDA enabled the team to efficiently identify and address financial issues. For example, in the final year of project implementation there was a drop in the exchange rate between Canadian and Bolivian currencies of almost 30%. The team managed this by reducing personnel and project activities. In order to maintain project activities, transport of staff to the communities was secured by CENDA with funds from other small projects.

10.7 Informed and Timely Action

Several factors enabled informed and timely action throughout the project:

- CENDA's project team worked closely with the local communities and made many local field trips, which allowed them to identify and address issues immediately.
- HealthBridge's quarterly reporting system allowed for regular review of the project progress and challenges. The system enabled efficient identification of weaknesses, which were discussed by Skype and email, as needed.
- A robust project monitoring system was developed, following DFATD's Results Based Measurement Framework, with indicators and targets for each project output and outcome. The monitoring system was developed jointly by CENDA and HealthBridge at the project start, and

modifications were made to indicators and targets, as relevant. Data were collected (such as 24 hour dietary recalls) at several intervals throughout the project to enable a regular assessment of progress.

11. Lessons Learned and Recommendations

Key lessons learned and related recommendations are described below:

- Nutrition promotion: Using the process of reflection with families, linking child nutrition with child health, physical and intellectual development, and emphasizing the contribution of ASF, was an important factor to the success of the project. When families understood how the meat and eggs from the interventions would contribute to their child's health and educational progress, they were much more committed and more likely to use the meat and eggs for family consumption. We recommend that this reflective process be used in other similar projects. The key factor is to use this process to identify the families' dreams for themselves and their children, and make the link to improved nutrition. It is also important that nutrition promotion is conducted *before* implementation of the agricultural/livestock interventions and delivery of materials. This increases the likelihood that families will implement the interventions and use the materials as the project intends, and not for some other purpose.

- Uptake of the interventions: Basing the interventions on traditional practices (e.g. sheep raising and chicken raising) that were not entirely new to the communities, not only helped to increase interest in the project, but it also enabled the project team to learn and build on the existing knowledge and experiences of local families.

- Construction of animal shelters: A lesson learned in constructing the sheep corrals was the need to leave openings in the walls (i.e. the stones must not be too close together) to allow the entry of air for ventilation to help control the presence of fleas, ticks and other parasites. One difficulty was that the time in the project workplan for the families to manufacture the adobe bricks (used to build the corral walls) was during the rainy season (December to February). The adobe bricks had to be protected by waterproof materials, such as plastic or metal sheets, until they dried. In the future, timing of the project should take this into account and build adobe structures during the dry season.

  For the chicken interventions, in some cases farmers saw the need for brooding hens to be in a quiet place, away from other animals, to reduce stress. To achieve this, some families built mud nests some distance from the main hen house, while others built a second floor in the main house for the nests. Some families used recycled materials to make chicken coop accessories, such as feeders, drinkers and nest-boxes. These were made from truck tires, plastic jugs and other materials. Shrubs were used to provide shade, or to strengthen the chicken wiring surrounding the courtyard of the henhouse.

- Starter flocks: The original starter flocks were supposed to be 7 hens and one rooster. However, identification of the sex of the chickens at an early age was difficult and in some cases, families received 4 roosters instead of one. When the chickens reach 4 to 5 months of age, the differential characteristics of hens and roosters become more apparent, including the body size, the crest and thickness of the legs. Therefore, it may have been better to wait until the chickens reach this age before delivering the starter flock.

  Additionally, delivery of the hens to beneficiaries required special care, especially providing their food during the trip. In some cases, chickens were picked up from the provider a day before the transfer to the communities, so it was necessary to care for and feed them. There were instances when road blockades due to social conflicts necessitated improvised solutions to provide water and shade. In fact, there were four chicken deaths due to problems in transit. That said, the breeds of the chickens selected for the interventions are tough and largely resistant to adverse conditions.

- Chicken feed: One of the most important elements of feeding hens is the calcium for bone development and egg formation. The hens naturally consume pebbles that contain calcite, complementing the calcium in the diet. Some families incorporated ground egg shell into the feed.

  Regarding vermiculture as a source of protein for hens, only 12% of families managed to keep worms alive and multiplying. The main causes of death of the earthworms were dehydration and waterlogging. Dehydration arose due to lack of the necessary water supply and excessive sun exposure. This new, non-traditional activity has not had encouraging results in the pilot communities. However, families were able to provide worms and maggots that are found in the plots of land used for crop production. The chickens hunted the insects which not only served as a protein source, but also a form of biological control.

- Animal disease control: Two major diseases in sheep are scabies and muyu muyu. Scabies was efficiently controlled using the traditional method of applying edible oil. Muyu muyu, meanwhile, can be controlled using rotational grazing. The parasite dies out on the ungrazed fields when there are no sheep there. There was a high demand to strengthen the control of respiratory diseases, mainly in young chickens. Providing garlic in their food in large quantities seemed to help prevent respiratory diseases.

- Egg Production: Hens began laying eggs at 6 to 7 months of age. The literature reports that it should begin at 5 months. It is assumed that the delays in egg laying were due to the harsh conditions, particularly the high altitude and cold. Egg production also varies between seasons. During the rainy season (December to April), production decreases considerably, and then

increases again in the winter season (May to July), reaching a peak in August to November. It is presumed that this variation is due to the humidity and cold affecting egg laying.

Egg production is also affected by a practice called "transhumance". During the productive months (November to March), when the crops are in full development, families move with their animal from the place where they have permanent homes to where they have "temporary" housing. One purpose is to prevent animals from damaging the crops around the permanent dwellings. The other purpose is to provide alternate forage. The practice of transhumance causes stress on the birds, which decreases egg production. On the other hand, families that do not practice transhumance enclose the hens in the hen house to prevent them from damaging the crops. This practice also causes stress to the birds, limits their access to grass, worms and calcite, and as a result, significantly reduces egg production.

- Gender: The project did not address gender issues related to roles and responsibilities of reproductive activities[1] other than child feeding, nor on domestic violence or participation of women in decisions about the use of communal space. Such issues do affect women's workload, nutrition and health status, and thus may have been worthy of more attention. An in-depth study on these issues would provide better understanding of their impact on women and children`s health, nutrition and workload, and how they could be addressed.

12. Final Financial Report

Please see Form C, attached. An analysis of variances between forecasted and actual expenses is discussed in Section 9. on Budget Management.

[1] "Reproductive activities" refers to all the tasks usually assigned to women relating to biological reproduction as well as household activities, housework, socialization and education of children, the family health care and food.

13. Annexes

13.1 Annex A: Logic Model

Please see attached document.

13.2 Annex B: Performance Measurement Framework

Please see attached document.

13.3 Annex C: Risk Register and Response Strategies

Project Title: Small Animal Husbandry to Improve Mother and Child Nutrition in Rural Bolivia **Budget:** $648,220 (CIDA contribution: $499,546) **Duration**: Three years			**Version:** 5 **Date:** June 30, 2015 **Team Leader:** Peter Berti							
Organization's Name: HealthBridge Foundation of Canada			Bolivia							
Risk Definition		**Updated Risk Response Strategy**	**Residual Risk Level**							
			Initial Rating	Oct 2012	Dec 31 2012	June 2013	Dec 2013	June 2014	Dec 2014	June 2015
Operational Risks										
Op1	Goal of reaching 25 communities may not be met, as to reach that number the project will need to work in communities with which the team is not currently working	A relationship must be developed before the project recommendations will be adopted. The team in Bolivia is meeting regularly with the communities, even now before the project has been approved by CIDA, to develop relationships and identify potentially interested communities. Team	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Very Unlikely	Very Unlikely

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Risk Definition		**Updated Risk Response Strategy**	**Residual Risk Level**							
			Initial Rating	Oct 2012	Dec 31 2012	June 2013	Dec 2013	June 2014	Dec 2014	June 2015
		will continue to partner with local communities and institutions to develop relationships.								
Op2	Traditional control of household financial resources and decision-making authority by men may result in meat and eggs being sold rather than consumed by the participating households, thereby	The project will ensure men's support, by actively engaging them in all levels of the project and by providing nutrition education that highlights the benefits of nutritious foods to their children's health, which will increase men's involvement in domestic responsibilities.	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely

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	negating attempts to improve nutritional status and not allowing women access to the project's benefits.									
Op3	In many communities there is migration to the cities of Cochabamba o Quillacollo to find work. This creates many residents who have two residence – one in the city and	Project actions are performed in the framework of the community organization, which also involves families who have dual residency. This ensures that these families also are committed to the project.				likely	likely	likely	likely	likely

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	one in the country.. This may lead to some families working on the Project with less intensity.									
Op4	The Andean Zone of Cochabamba has high levels of poverty, that lead to the presence of a diversity of development institutions. Many of these have welfarist forms of work, so some	This risk is being managed through discussion with the people on the issues relating to nutrition and food security in different areas (family, community, etc..), showing that solutions can be developed through innovative actions that can be sustainable in the				Probable	Probable	Unlikely	Unlikely	Unlikely

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	families confuse project implementation, with passively receiving gifts.	time. Also, prioritizing existing community input, encourages the communities to fully participate.								
Op5	Annual changes in the leadership of communities, can create the risk that the new authorities have no sympathy with the actions of the project and may hinder the development	The project technical staff constantly shares and evaluates the project implementation with community organizations. Also staff work to strengthen the community organizations as much as time allows.				Probable	Probable	Unlikely	Unlikely	Unlikely
Op6	Possible	The project				Unlikely	Probable	Very	Very	Very

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	changes at the level of Advisory Board of Cenda, and of the institutional regulations could lead to an institutional and personnel re-organization.	information is organized and shared with others in CENDA. In case of changes, a process of transition and transfer of information will be provided. The project forms part of the institutional program, which was approved by the Assembly at the highest authority within CENDA. CENDA underwent a change in its Executive Director, however, this has not affected the project or the personnel						unlikely	unlikely	unlikely

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		involved in the project.								
Op7	Infrastructure for poultry houses being used for other family activities (tanks, silos, sheep pens, etc)	Regular discussion with the parents will be conducted on the benefits of good nutrition for physical and intellectual development of children.				Probable	probable	Probable	Probable	Probable
Financial Risks										
Fin1	Matching funds may not be raised by HealthBridge	Fundraising is ongoing and HealthBridge has always met fundraising requirements in previous projects.	Very unlikely	Very unlikely	Very unlikely	Very unlikely	Very unlikely	Very unlikely	Very unlikely	Very unlikely

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Development Risks										
Dev1	Global climate change may change the viability of small animals in the project area.	The key challenge of climate change is expected to be increasingly erratic rainfall, which could threaten forage production. Risk will be mitigated by developing water management strategies. The project team will also pilot different breeds within the same ecological zones to include those which are heat tolerant, drought tolerant, flood tolerant, etc.	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely

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Dev2	Political instability may interfere with project In December 2013 he has expelled a Danish NGO, creating animosity between the government and NGOs, and this situation could be transmitted to the government's rural bases and amongst the population with	The project team will cultivate close relationships with local authorities to allow work to progress regardless of national political climate.			Very unlikely	Very unlikely	Unlikely	Unlikely	Unlikely	Unlikely

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	whom CENDA works.									
Dev 3:	2014 and 2015 is election year so in rural communities there will be a strong political mobilization. The large number of electoral and political activities may reduce the time available for the development of communal project activities.	As above, the project team will continue to cultivate close relationships with local authorities to ensure that the work is allowed to progress and is made a priority.					Unlikely	Unlikely	Unlikely	Unlikely

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Reputation Risks										
REP1	Canadian stakeholders may publicly not support program.	An active public engagement campaign will actively develop public support. Furthermore, the proposed work is inherently non-contentious and is expected to receive popular support.	Very unlikely	Very unlikely	Very unlikely	Very unlikely	Very unlikely	Very Unlikely	Very Unlikely	Very Unlikely

13.4 Annex D: List of all Project and Technical Reports

Project Narrative Reports and Work Plans

1. Annual Work Plan for Year 1, 4 July 2012 – 30 June 2013
2. Annual Report for Year 1, 4 July 2012 – 30 June 2013
3. Annual Work Plan for Year 2, 1 July 2013 – 30 June 2014
4. Semi-Annual Report for Year 2, 1 July 2013 – 31 December 2013
5. Annual Report for Year 2, 1 July 2013 – 30 June 2014
6. Annual Work Plan for Year 3, 1 July 2014 – 30 June 2015
7. Semi-Annual Report for Year 3, 1 July 2014 – 31 December 2015

Technical Reports

1. Diet of children and women (24 hour dietary recall)
2. The “flow” of meat in the communities and sheep husbandry
3. Breastfeeding practices
4. Gender roles in food production

13.5 Annex E: Tables of all Project Milestones and Completion Date

Output	Milestone	Completion
Project Year 1: July 4 2012 – June 30 2013		
Administrative	1. First meeting between CENDA and HealthBridge. 2. Agreements signed with local authorities and HealthBridge/CENDA. 3. End of year planning meeting between HealthBridge and CENDA	1. First meeting took place in September 2012 2. Agreements signed in Semester 1. 3. End of year planning meeting took place in July 2013.
Project Evaluation	1. PMF Developed and submitted 2. Baseline data collection started 3. 24-hour dietary recall survey completed.	1. PMF was submitted with the Annual Work Plan in October 2012. 2. Baseline data collection started and results submitted to CIDA (DFATD) in July 2013. 3. 24 hour dietary recall survey was completed.
Output 1111: Data on young child feeding practices, household food consumption practices, and household decision-making dynamics integrated to identify areas of overlap and exclusion.	1. Coordination meetings and visits initiated with families and authorities. 2. Participatory meetings held on household decision making dynamics as they relate to animal husbandry and child feeding.	1. Coordination meetings and visits were initiated in August 2012. 2. Qualitative data on household decision making dynamics collected through participatory workshops.
Output 1121: Development implementation and evaluation of improved small animal husbandry practices in 5 communities.	1. Document review and interviews with experts on animal husbandry completed. 2. Pilot trials initiated with 6 families in 3 communities. 3. 1 zonal sharing forum held to share experiences from the pilot.	1. Interviews with experts completed. Literature review is currently underway. 2. Pilot trials initiated with 20 families in 4 communities. 3. Zonal sharing forum has not been completed. Will be done once pilot trials are finished.
Output 1131: Men and women farmers trained in improved water, soil and forage management techniques.	1. Training on improved water, soil and forage management integrated into animal husbandry pilot trials.	1. Training has been conducted informally as part of animal husbandry pilot trials.

Output	Milestone	Completion
Project Year 1: July 4 2012 – June 30 2013		
Output 1211 **Community-based nutrition promotion activities conducted** in 5 communities	1. Participatory workshops on nutrition conducted	1. Participatory nutrition education workshops conducted on: food cycle, nutritional value of different foods, best breastfeeding practices and preparation of nutritious foods
Output 1311 **Local men to serve as role models** in sharing animal husbandry and decision making around use of food produced.	1. Community workshops on family roles conducted	1. Participatory workshops were held to collect information on household decision making and family roles related to animal husbandry and domestic tasks. Informal discussions about the importance of equitable role distribution conducted during pilot trials.
Output 1321 **Both men and women actively involved** in animal husbandry trials and nutrition promotion activities.	1. Both men and women involved in pilot trials and nutrition workshops	1. Both men and women have been involved in the pilot trials and all community workshops.

Output	Milestone	Completion
Project Year 2: July 1 2013 to June 30 2014		
Administrative	1. Planning meeting between HealthBridge and CENDA in each quarter	1. Planning meeting between HealthBridge and CENDA was held in Cochabamba November 10 – 17
Output 1111: Data on young child feeding practices, household food consumption practices, and household decision-making dynamics integrated to identify areas of overlap and exclusion.	1. All data collection completed.	1. All data collection completed.

Output	Milestone	Completion
Project Year 2: July 1 2013 to June 30 2014		
Output 1112 Report produced, published and disseminated about the existing species/breeds and practices in Bolivia and their overlap and exclusion with feeding practices and dietary preferences.	1. Data analyses completed and reports finalized.	1. Data analyses completed and five reports finalized: 1) "Flujo de carne" study 2) 24 hour dietary re-call 3) Breast-feeding practices 4) Gender dynamics 5) Animal carrying capacity in Andean communities
Output 1121 **Development, implementation and evaluation** of improved small animal husbandry practices in 4 communities.	1. Zonal forum held 2. Pilot trials completed	1. Zonal forum has not yet been held. 2. Pilot trials with 20 families in Nunuayani and Valentia (for chickens), and in Chillavi (for sheep) have been completed and expanded to other families in these communities (total of 64 families).
Output1122 **Report produced, published and disseminated** about lessons learned in development of new practices.		Report completed on lessons learned in the breeding and management of chickens in communities in the Andean region of Cochabamba.
Output 1123 Most appropriate **small animal husbandry practices scaled up** to 20 communities.	1. Workshops for socialization of pilot initiated in scale-up communities. 2. Scale-up of small animal husbandry practices initiated.	1. Workshops initiated in 6 new communities of the Andean Zone (Chilliguani, Ch'ajuela, Kochipampa, Bajo Chillavi, P'alta Cueva and Milluni). 2. Initiated the expansion of pilot projects in five communities: sheep in 2 communities (P'alta Cueva and Bajo Chillavi) and chickens in 3 communities (Chilliguani, Chajuela and Kochipampa).
Output 1131 **Men and women farmers trained** in improved water, soil and forage management techniques.	1. Information on water, soil and forage management integrated into	1. CENDA provides information on water, soil and forage management in the animal husbandry

Output	Milestone	Completion
Project Year 2: July 1 2013 to June 30 2014		
	animal husbandry education.	training. Training workshops on soil management and fodder for livestock feed are under development.
Output 1211 **Community-based nutrition promotion activities conducted** in 4 communities	1. Informal discussions about nutrition education conducted during pilot visits.	1. CENDA staff engages in informal nutrition education discussions during pilot visits about the importance of animal-source foods and breast feeding.
Output 1212 **Report produced published and disseminated** about lessons learned in promoting consumption changes	1. Educational video produced	Video titled "We are improving our diet", produced and disseminated through CENDA's website http://cenda.org/item/61-mikhunanchiq-sumaqta-yuyaychawanchiq-nuestra-comida-nos-da-sabiduria
Output 1213 **Best nutrition promotion activities scaled up** to 20 communities.	1. Community nutrition workshops initiated in zonal communities.	Nutrition promotion targeted at consumption of proteins, fats and animal foods delivered through reflective workshops in 6 communities in the Andean region (Chilliguani, Kochipampa, Bass Chillavi, P'alta Cave Milluni and Chajuela)
Output 1311 **Local men to serve as role models** in sharing animal husbandry and decision making around use of food produced.	1. Community workshops conducted on sharing family responsibilities and decision making.	Workshops on gender roles and decision-making related to agriculture and household nutrition conducted in 9 communities in the Andean Zone (Chillavi, Bass Chillavi, P'alta Cave, Challa Grande, Ñuñumayani, Valentia , Chajuela, Kochipampa and Chilliguani).
Output 1321 **Both men and women actively involved** in animal husbandry trials and nutrition promotion activities. .	1. Both men and women actively encouraged to be involved in all scale-up activities.	Men and women in the 9 intervention communities (Ñuñumayani, Valentia, Challa Grande, Kochipampa, Chajuela, Chilliguani, Chillavi, Bajo Chillave and P'alta Cueva) are actively involved in nutrition promotion activities and management of sheep and chickens.

Output	Milestone	Completion
Project Year 3: July 1 2014 to June 30 2015		
Administrative	1. Semi-Annual Report for Year 3 submitted. 2. Annual Report for Year 3 submitted.	2. Semi-Annual Report submitted. 3. Annual Report for Year 3 submitted.
Output1122 **Report produced, published and disseminated** about lessons learned in development of new practices.	Report on lessons learned from raising chickens and sheep produced and shared for feedback.	In Semester 1 a supplementary insert was developed in CENDA's newspaper on lessons learned in nutrition, handling chickens and sheep by peasant communities in the Andean region of Cochabamba.
Output 1123 Most appropriate **small animal husbandry practices scaled up** to 20 communities.	Semester 1. Appropriate animal husbandry practices scaled-up to 6 new communities through method of farmer to farmer learning. Semester 2. Appropriate animal husbandry practices scaled up to 5 new communities through method of farmer to farmer learning.	Semester 1. Animal husbandry practices scaled up to 14 new communities. Semester 2. Animal husbandry practices scaled-up to 5 new communities (Chillca Chico, Chillca Grande, Kjarkas, Chiruni and Pongo Pata).
Output1124 **Report produced, published and disseminated** about lessons learned in scale up of animal husbandry practices.	Report on lessons learned produced and disseminated.	Report produced n December 2015.
Output 1131 **Men and women farmers trained** in improved water, soil and forage management techniques.	Development of pilot plots of silage fodder.	Pilot plots of forage production were implemented with five families in Chillavi and Bajo Chillavi, to use as livestock feed in the dry season.

Output	Milestone	Completion
Project Year 3: July 1 2014 to June 30 2015		
Output 1211 **Community-based nutrition promotion activities conducted** in 4 communities	Evaluation of nutrition promotion	In Semester 1, monitoring of changes in nutrition knowledge was conducted through participatory workshops and follow-up in 5 communities.
Output 1212 **Report produced published and disseminated** about lessons learned in promoting consumption changes	Lessons learned report on changes in food consumption shared with communities for feedback.	A supplementary insert for CENDA's newspaper was developed on lessons learned in nutrition and managing chickens and sheep in the Andean region of Cochabamba, and an article was developed for the newspaper Conosur Ñawpaqman on lessons learned in raising chickens.
Output 1213 **Best nutrition promotion activities scaled up** to 20 communities.	Semester 1: Scale-up of appropriate nutrition promotion practices to 6 new communities. Semester 2: Scale-up of appropriate nutrition promotion practices to 5 new communities.	Semester 1: Nutrition promotion activities scaled-up to 14 new communities. Semester 2: Nutrition promotion activities scaled-up to 5 new communiites (Chillca Grand, Chillca Chico, Kjarkas, Chiruni, Pongo Pata).
Output 1214 **Report produced, published and disseminated about lessons learned** in scale up of nutrition promotion activities.	Report on lessons learned produced and disseminated.	Report produced in December 2015.
Output 1311 **Local men to serve as role models** in sharing animal husbandry and decision making around use of food produced.	Sharing experiences from farmer to farmer, from the perspective of gender roles.	An Exchange of Experiences on nutritional practices and livestock management was conducted in 16 communities, at which men and women discussed and evaluated their experiences and family involvement in such activities.
Output 1321 **Both men and women actively involved** in animal husbandry trials and nutrition promotion activities.	Report released on the participation of men and women in animal husbandry practices and child feeding.	Results Included in Final Project Report

13.6 Annex F: List of all Project Consultants

Name	**Type of Support Provided**
Viviana Rodas	Veterinary specialist
Margot Cabrera	Veterinary specialist
Steve Vaneck	Conducted "Meat Flow" study
Rosmery Borja	Conducted Mid-term Review Study

13.7 Annex G: List of Key Participating Government and Civil Society Partners

Please see attached document.

13.8 Annex H: Distribution and Transfer of Project Assets

Please see attached documents.