FEED THE FUTURE
The U.S. Government's Global Hunger & Food Security Initiative

LINKING AGRICULTURE & NUTRITION
PATHWAYS | PRINCIPLES | PRACTICE

INCREASING NUTRITION SENSITIVITY OF VALUE CHAINS:

A REVIEW OF TWO FEED THE FUTURE PROJECTS IN GUATEMALA

USAID
FROM THE AMERICAN PEOPLE

SPRING
Strengthening Partnerships, Results, and Innovations in Nutrition Globally

ABOUT SPRING

The Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING) Project is a five-year USAID-funded Cooperative Agreement to strengthen global and country efforts to scale up high impact nutrition practices and policies and improve maternal and child nutrition outcomes. The project is managed by JSI Research & Training Institute, Inc., with partners Helen Keller International, The Manoff Group, Save the Children, and the International Food Policy Research Institute.

RECOMMENDED CITATION

SPRING. 2015. *Increasing Nutrition Sensitivity of Value Chains: A Review of Two Feed the Future Projects in Guatemala.* Arlington, VA: USAID/Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING) project.

DISCLAIMER

This report is made possible by the generous support of the American people through the United States Agency for International Development (USAID) and Feed the Future, the U.S. Government's global hunger and food security initiative, under the terms of the Cooperative Agreement AID-OAA-A-11-00031 (SPRING), managed by JSI Research & Training Institute, Inc. (JSI). The contents are the responsibility of JSI and the authors, and do not necessarily reflect the views of USAID or the U.S. Government.

ACKNOWLEDGEMENTS

SPRING would like to thank the Rural Value Chains Projects implemented by AGEXPORT and ANACAFÉ for agreeing to facilitate this research and for practical and logistical support. Special thanks to lead author, Alyssa Klein (SPRING), and the primary consultant, Ricardo Pineda, for supporting the development of the review protocols and field work; and to the reviewers, Heather Danton, Anu Narayan, and Victor Pinga (SPRING). Finally, many thanks to USAID/Guatemala for feedback and support throughout the duration of the work.

SPRING

JSI Research & Training Institute, Inc.
1616 Fort Myer Drive, 16th Floor
Arlington, VA 22209 USA
Phone: 703-528-7474
Fax: 703-528-7480
Email: info@spring-nutrition.org
Internet: www.spring-nutrition.org

Cover photo by Judiann McNulty, SPRING

CONTENTS

ACRONYMS

AGEXPORT	Asociación Guatemalateca de Exportadores (Guatemalan Exporters' Association)
Agros Ixil	Asociación Agros Ixil
AIDA	Asociación Integral de Desarrollo Agrícola
ANACAFÉ	Asociación Nacional del Café (Guatemalan National Coffee Association)
COPITEM	Cooperative Integrated production Momostecan Craft The Weaver Limited Liability
DFID	Department for International Development [UK]
FAO	Food and Agriculture Organization [United Nations]
FUNCAFÉ	Fundación de la Caficultura para El Desarrollo Rural (Coffee production foundation for rural development)
GLOBALG.A.P.	G.A.P. stands for good agricultural practices. GLOBALG.A.P. sets voluntary standards for the certification of agricultural products around the globe and certifies those that comply.
INCAP	Instituto de Nutrición de Centroamérica y Panamá (Nutrition Institute of Central America and Panama)
M&E	monitoring and evaluation
RVCP	Rural Value Chains Project
SBC	social and behavior change
SPRING	Strengthening Partnerships, Results, and Innovations in Nutrition Globally project
STC	Save the Children
UNICEF	United Nations Children's Fund
USAID	U.S. Agency for International Development
VC	value chain
WASH	water, sanitation, and hygiene
WHIP	Western Highlands Integrated Program

RATIONALE FOR NUTRITION-SENSITIVE AGRICULTURE

Photo by Hector R. Santos, USAID

Globally, there is a substantial evidence base for effective and cost-effective nutrition-specific interventions. The 2008 series from *The Lancet* on maternal and child nutrition highlighted several high-impact nutrition-specific interventions in the 36 countries with the highest levels of malnutrition, which encompass 90 percent of the total global burden. These interventions include complementary feeding, general supportive strategies to improve family and community nutrition, micronutrient interventions, the promotion of breastfeeding, reduction of disease burden, and strategies to promote community nutrition. In the series, *The Lancet* authors presented the evidence for these nutrition-specific interventions and projected reductions in stunting and effects on child survival that implementation at scale would yield. Using this evidence, the authors concluded that, although critical, the interventions alone are insufficient to achieve global targets (Bhutta et al. 2008). In fact, a follow-up series from *The Lancet*, published in 2013, reported that only 20 percent of stunting in children under five years would be averted if 10 evidence-based nutrition-specific interventions were to achieve 90 percent coverage (Bhutta et al. 2013). Numerous researchers, practitioners, governments, and donors have determined that, to reach the other 80 percent, a combination of nutrition-specific and "nutrition-sensitive" interventions are needed. Nutrition-specific interventions address the immediate determinants of malnutrition, such as dietary intake and disease (Ruel et al. 2013). Nutrition-sensitive interventions address the underlying determinants of malnutrition, such as access to health services, caregiving resources, food security, and a safe, hygienic environment.

The U.S. Agency for International Development's (USAID's) *Multi-Sectoral Nutrition Strategy 2014–2025* includes the following interventions in its definition of nutrition-sensitive: family planning, specifically, healthy timing and spacing of pregnancy; water, sanitation, and hygiene (WASH); nutrition-sensitive agriculture; food safety and food processing; early childhood care and development; girls' and women's education; economic strengthening and livelihoods; and social protection (USAID 2014). Additionally, the U.S. Government's Feed the Future presidential initiative supports a country-driven approach to address the root causes of poverty, hunger, and undernutrition. Feed the Future's two objectives include agriculture sector growth and improved nutritional status for women and children, with the intended outcome of sustainably reducing poverty and hunger. USAID Missions in Feed the Future focus countries are employing a range of multisectoral programming, with the assumption that nutrition-sensitive interventions will help ensure that Feed the Future achieves its ambitious goal of reducing stunting by 20 percent over

five years in the areas where it works.[1] The evidence for how nutrition-sensitive interventions lead to improved nutritional status is less robust than that for nutrition-specific interventions, especially with regard to the linkage between agricultural interventions and nutrition outcomes. Herforth and colleagues stated in a 2012 paper, "Despite the clear potential for agricultural change to improve nutrition in low- and middle-income countries, the evidence base for this relationship is poor (Herforth et al. 2012)."

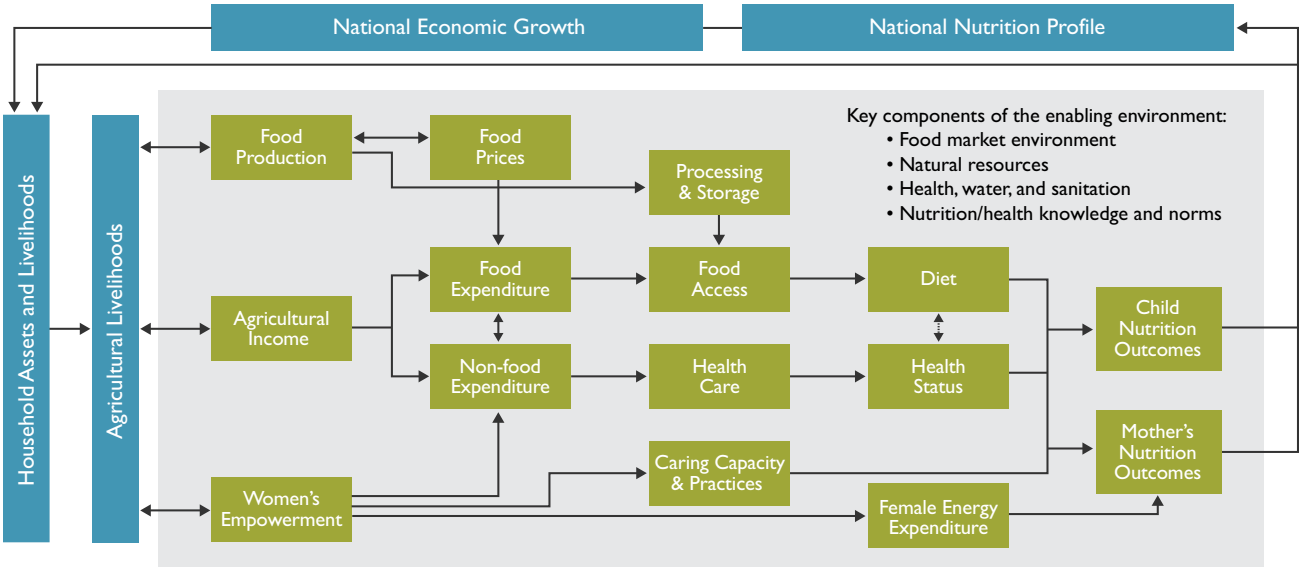
Recent systematic reviews of studies that have evaluated agricultural interventions for improving nutrition reveal minimal compelling evidence of impact, and demonstrate a need for further quality research (Hawkes, Turner, and Waage 2012). Systematic reviews have revealed that "merely producing more food does not ensure food security nor improved nutrition" (Herforth et al. 2012), and that "agriculture interventions do not always contribute to positive nutritional outcomes" (FAO 2012). A 2013 paper by Webb analyzed literature on whether agriculture pathways can improve nutrition. This analysis revealed that current knowledge on nutritional improvements attributable to agriculture-based interventions is "weak and mixed," which reflects "partial, often imperfect, knowledge of links along the chain from agriculture to nutrition, regardless of pathway" (Webb 2013). Despite this paucity of evidence, field experience indicates that nutrition-sensitive agriculture interventions, when properly implemented, can significantly contribute to improved nutrition outcomes.

1 In 2013, the United States announced that between 2012 and 2014, it anticipated spending more than US$1 billion on nutrition-specific interventions and more than US$8.6 billion on nutrition-sensitive interventions. As part of a comprehensive approach, Feed the Future integrates a wide array of these interventions into its programs. See http://feedthefuture.gov/sub-approach/improved-nutrition.

A CONCEPTUAL FRAMEWORK LINKING AGRICULTURE AND NUTRITION

The conceptual pathways between agriculture and nutrition (Herforth and Harris 2014) (Figure 1) were described to better understand how nutrition-sensitive agriculture functions in relation to general nutrition sensitivity. Although agriculture may be viewed primarily as a source of diverse, nutritious foods and income, its effect on nutrition is multifaceted, especially considering the critical role women play in agriculture. First, agriculture facilitates a healthy, active life by producing foods within households and for their own consumption, and by increasing access to foods within local markets. Second, when agriculture is a source of livelihood, it increases income levels, which facilitate the purchase of more diverse food as well as access to other primary social services such as health care. Third, agricultural livelihoods affect gender relations and the relative status of women. A female's health and nutrition, as well as the health and nutrition of her children, are impacted by her time use, energy expenditure, and her access to and control over both productive resources and her household's income. These three key pathways regularly interact and are not always linear. As shown in Figure 1, various agriculture livelihood investments and activities can improve access to food and health care at the household level, impact and be affected by the enabling environment surrounding the household, and ultimately affect the nutrition of women and children within those households.[2]

Figure 1. The conceptual pathways between agriculture and nutrition



The conceptual pathways between agriculture and nutrition provide a useful tool for project designers and implementers to test their assumptions and determine whether their project interventions will reach and assist target populations in moving toward improved maternal and child nutrition. Through a landscape analysis of each of the 19 Feed the Future focus countries, the Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING) project determined that many Feed the Future portfolios prioritized spending on agriculture interventions, with the proportion of nutrition-focused spending and interventions being significantly smaller.

2 A short summary of the pathways is in Appendix 1. For more detail, see SPRING's technical brief series at http://www.spring-nutrition.org/publications/series/improving-nutrition-through-agriculture-technical-brief-series.

Photo by Judiann McNulty, SPRING

In practice, this has indicated that large value chain projects often include a smaller nutrition component that promotes nutrition-specific messaging and education coupled with home garden interventions. These parallel, nutrition-oriented interventions are intended to increase home consumption of diverse foods or provide an opportunity for families to increase earnings as they sell their surplus production in local markets. Usually, a significantly larger value chain component targets staple crops (such as maize or rice), high-value export food crops (such as horticulture or nuts), or nonfood exports (such as coffee or handicrafts). It is necessary to examine these value chains in order to incorporate interventions that can potentially further nutrition-sensitive agriculture outcomes or support other nutrition-specific programming.

APPLYING PATHWAYS THINKING TO VALUE CHAINS AND FOOD SYSTEMS

Photo by Judiann McNulty, SPRING

The conceptual pathways described above reflect the relationships among determinants of nutrition-sensitive agriculture within the household. Yet the agriculture sector encompasses a far greater sphere than agriculture producer households. The food and agriculture system also is comprised of people and institutions that are involved in the consumption, disposal, marketing, processing, and production of food, and includes inputs and outputs at each step. Economic, sociopolitical, and technological environments are also associated with the food system. These environments are separate from households, but also envelop households and their members, as households and their individual members are part of the food system. Food system activities affect the availability and affordability of food for all food consumers, including producer households, as well as the demand for diverse and nutritious foods. The food system also impacts the natural resource environment; the health, water, and sanitation environment; and the knowledge and norms surrounding nutrition and health.

The three starting points in the pathways diagram (production, income, and empowerment) represent outcomes of agricultural commodity value chains functioning within the larger food system. Improvements can be made to enhance nutrition outcomes of the value chain activities, regardless of the selected crop's nutrition content. For each stage of the value chain[3] and food system—inputs, production, processing, storage, retail, consumption, and waste and recycling (Figure 2)—a number of opportunities may exist to enhance nutrition sensitivity.

Figure 2. Key stages of an agricultural commodity value chain and food system

The sections below explain how a range of interventions may be considered or altered to become more nutrition-sensitive. Interventions may take place at all levels, not solely within households. Many interventions reflect and emphasize the importance of implementing well-planned behavior change and capacity building interventions. Describing activities funded under Feed the Future, **the presented examples do not comprise a complete set of possible strategies or interventions.** Rather, the collection was assembled to describe how food systems may mitigate underlying

3 Value chains end just before the end market, normally retail, as consumers are typically the end market. Consumption, post-consumer waste, and recycling, which usually occur after the retail stage, are not considered part of the value chain. Consumption, post-consumer waste, and recycling are, however, part of the food system, and therefore are included here.

contributors to undernutrition before outcomes from agricultural activities are realized. These examples are presented in the order that they appear among the key stages of an agricultural commodity value chain and food system.

SAMPLE NUTRITION-SENSITIVE INTERVENTIONS ALONG THE VALUE CHAIN AND IN THE FOOD SYSTEM

Inputs

- Introducing **labor-saving technologies** can decrease the amount of time spent on farming activities and allow more time for other project-promoted activities, such as child care. Labor-saving technologies include drip irrigation, integrated pest management, and mulch. Often, these technologies save money as well as time while simultaneously promoting production outcomes.

- Sowing **improved seeds** for food and/or cash crops may increase production of plants that are more nutritious or more resistant to pests or diseases. The additional production may then be consumed by families as part of an improved diet, or sold by families, therefore increasing the household income. A decision to cultivate one or more biofortified crops results in an increased amount of nutritious foods available in markets and potentially mitigates micronutrient deficiencies within a population target area, making this practice is an example of a nutrition-sensitive agriculture intervention.

Production

- Promotion of the use of improved **agricultural practices such as pruning, shade management, spacing, and timing of planting** contributes to increased crop production. Capacity building on such topics may enable smallholder producers to maximize the potential of the resources they do have, allowing them—without a large additional investment—to produce more and, ideally, to earn more from their production in a way that sustains the natural resource base on which farmers depend for their livelihood. Use of sustainable agricultural practices does not guarantee a direct contribution to the nutrition of producer households. However, coupling promising agricultural production practices with financial support programs and behavior change education may result in improved household nutrition. Financial support programs could focus on household budgeting instruction and increased access to financial or social protection services, both of which assist in smoothing seasonal income fluctuations. Education focused on behavior change could encourage improved food purchase and consumption practices, promote a more diverse and nutritious diet, possibly resulting in improved household nutrition.

- Using **greenhouses or other controlled environments** may permit crop diversification or the extension of growing seasons. Such activities should promote consumption of the range of crops being grown (most often vegetables), thereby increasing the diversity of foods available for consumption in producer households and for purchase in markets. This practice also creates new markets for farmers, decreases oversaturation of one or two products in markets, and provides year-round cash flow and availability of food to small farmers. Due to the intensification of production that is possible in controlled-environment systems, greenhouse

technologies may also decrease time demands on women, therefore increasing the time available to care for their children.

- Promotion of **good soil and water management practices**, a requirement for sustainable production, may include nutrition-sensitive agriculture messages such as retention of micronutrients in the soil and ensuring safe water use to avoid harm to the health of people and animals. Soil conservation practices can maintain nutrients in soil and in foods, as well as increase production. Additionally, sustaining soil health could allow farmers to produce on limited land over the long term, increasing farmers' resilience. Sustainable management of forests, soils, and water sources would contribute to safe food and water sources, decrease erosion, help sustain production, and protect water sources.

- **Intercropping** diversifies production and may expand local and international market opportunities, as well as increase household consumption of a diversity of nutritious foods while helping to conserve soil. Intercropping may also decrease the need for separate plots for home gardens, which are often abandoned due to insufficient land, time, or water.

- Practices aimed at **decreasing the prevalence of aflatoxins**[4] are critical along multiple stages of the value chain and production. Improved cropping, drying, harvesting, and storage practices, as well as switching to crops or foods less prone to aflatoxin contamination, have the potential to decrease levels of aflatoxin in foods consumed by humans and animals. These decreased levels of aflatoxins in foods would improve human health and nutrition outcomes.

Processing and Storage

- **Processing at the cooperative level** rather than at the household level contributes to quality control and can create local jobs, especially jobs for women, who may lack access to sufficient land to support year-round food production. Cooperative-level processing could also decrease water use and improve the environment. Contaminated water and waste can be safely broken down and reused as fertilizer rather than permitted to run off into streams and other water sources. Furthermore, income-earning opportunities for cooperative members may expand due to the improvements in product quality and/or increased opportunities for value additions to products before their sale.

- **Packing horticulture products at the cooperative level** could add value and ensure that products that do not meet buyer standards could remain with farmers and be sold in local markets or consumed at home. This would potentially increase the availability of nutrient-dense foods for households.

- **Developing a local market for horticultural crops that do not meet export quality standards** could facilitate the establishment of microenterprise, which would create local jobs and expand the diversity of nutritious food available locally. Linking efforts for product development and social and behavior change communication could build the local demand for the new products. This demand could incentivize producers to diversify production, and could motivate the creation of markets for products rejected by export buyers.

4 Aflatoxins are a naturally occurring carcinogenic byproduct of common fungi on grains and other crops.

Marketing and Retailing

- **Expanding the number of domestic and international buyers** could increase demand and consequently the scale of production and the number of farmers able to participate. Such expansion may create a broader range of potential markets as well as new incentives and income opportunities. In the case of nutrient-rich crops, such incentives to production may also be accompanied by messages promoting consumption of these foods.
- **Expanding local demand** could relieve saturated export markets and extend the season for producers, which would improve year-round food availability and access for producer households, as well as the availability and diversity of nutritious foods in local markets for consumers.
- **Creating links to local and municipal markets** could help increase the availability of and access to diverse nutritious foods throughout the year.

Consumption

- While income is a key incentive to the roles played by the range of food system actors, **encouraging better consumption practices** may also contribute to increases in income. More nutritious consumption practices would expand markets by increasing demand for more nutritious foods. **Education** on dietary diversity, feeding and food preparation, healthy foods, and hygiene, can occur at cooperatives, health centers, households, schools, and other locations to engage stakeholders and encourage adoption of improved dietary practices. Advertising or behavior change communication campaigns could also promote better spending and consumption practices.
- Designing a strategy to **influence what people purchase** in local shops could create demand for more nutritious, locally produced products and improve dietary diversity.
- **Techniques for preserving horticulture products** could increase year-round horticulture consumption by facilitating the storage of fruits and vegetables, which have a short shelf life. This storage facilitates consumption of a more diverse diet for an extended portion of the year. Such value addition would also provide new income opportunities for those who may process and sell these preserved products.
- **Targeted messages about not using irrigation water as a source of drinking water** could improve human health in communities.

Waste

- Technical support for **composting waste materials with probiotics** could reduce the time needed for decomposition, improve environmental and human health, and save money for producer households.
- Ensuring a plan for **safe disposal of agricultural waste materials** (such as empty fertilizer containers, plastic mulch sheeting, and irrigation tubing) could preserve both environmental and human health. For example, safe disposal of empty pesticide containers and community-wide messaging related to the health hazards associated with pesticide usage could help deter communities' use of pesticide-contaminated containers to store drinking water or food, which would improve residents' health.

GUATEMALA CASE STUDY

To better understand how and where linkages to nutrition may be leveraged within agricultural value chain programming, SPRING sought to gain a comprehensive understanding of two USAID-funded value chain activities in Guatemala, and explored ways in which these value chains could increase their relative nutrition-sensitivity. Both activities are Rural Value Chains Projects (RVCPs) and are implemented by two different consortia, Asociación Guatemalateca de Exportadores (AGEXPORT) and the Asociación Nacional del Café (ANACAFÉ).

RURAL VALUE CHAINS PROJECTS

Implemented by AGEXPORT and ANACAFE in Guatemala, both RVCP activities focus on coffee, horticulture, and handicrafts value chains, with a primary objective of increasing the incomes of smallholder farmers.

BACKGROUND

A WORD ABOUT TRAININGS

Trainings to improve knowledge and skills are recommended along many stages of the value chain as a way of promoting nutrition-sensitive agriculture. To ensure that trainings do no harm, it is critical that they consider environmental and social factors and other demands on participants' time and energy. Linking training to access to and use of new technologies may be one way to enhance nutrition-sensitive agriculture outcomes.

Chronic malnutrition rates in Guatemala have remained stubbornly high, and with 54 percent of children under the age of five years being moderately to severely stunted, the country ranks third-highest in the world for undernutrition (UNICEF 2009). Among rural and indigenous children in Guatemala, stunting rates nationally are 59 and 66 percent, respectively. These rates of stunting reach even higher levels in some regions of the Feed the Future zone of influence, which includes 30 municipalities in five departments of the Western Highlands: Totonicapán, San Marcos, Huehuetenango, Quetzaltenango, and Quiché (Feed the Future 2011). As part of its effort to confront the challenge of undernutrition, the Government of Guatemala is implementing a multisectoral response through its Zero Hunger strategy and donor support from the Feed the Future initiative.

In Guatemala, Feed the Future applies the value chain approach to transition families out of poverty and improve both their incomes and access to food. Complemented by improved access to health services, access to potable water, and comprehensive hygiene and nutrition education, agricultural value chain activities are expected to result in poverty reduction and improved nutrition for the targeted population.

ACTIVITY DESCRIPTIONS

USAID designed the RVCPs around income-generation interventions focused on coffee, handicrafts, and horticulture value chains in Guatemala's Western Highlands. Awarded as two separate activities, the RVCPs are implemented by AGEXPORT, ANACAFÉ, and their subcontractors. RVCPs are expected "to improve household access to food by expanding and diversifying rural income and to contribute to improve the nutritional status of families benefited under this program" (USAID Guatemala 2011). This is to be accomplished by "expanding the participation of poor rural households in productive value chains, and linking these chains to local, regional, and international markets" (USAID Guatemala 2011). Tables 1 and 2 provide an overview of the two activities.

Table 1. Rural Value Chains Project—AGEXPORT

PERIOD OF PERFORMANCE	May 2012–May 2017
GEOGRAPHIC REGION	12 municipalities in Quiché, Totonicapán, and Quetzaltenango
TARGET VALUE CHAINS	Coffee, handicrafts, and horticulture
TOTAL BUDGET	US$23 million
OBJECTIVE	Increase incomes of rural families in the selected municipalities by increasing their participation in the target value chains.
DESCRIPTION	RVCP AGEXPORT plans to work with 140 rural value chains (85 focused on horticulture, 25 on coffee, 30 on handicrafts) focusing on the following six components: • Improving value chain competitiveness • Increasing participation in these value chains • Improving agriculture productivity • Expanding markets and commercialization with private sector participation • Increasing the productivity of crops grown for home consumption and improve food utilization • Improving competiveness of the handicrafts value chain Additionally, the activity has five cross-cutting themes, including cultural identity, environmental sustainability, gender, knowledge management, and rural financial services.

* AGEXPORT 2012.

Table 2. Rural Value Chains Project—ANACAFÉ

PERIOD OF PERFORMANCE	May 2012–May 2017
GEOGRAPHIC REGION	18 municipalities in Huehuetenango and San Marcos
TARGET VALUE CHAINS	Coffee, handicrafts, and horticulture
TOTAL BUDGET	US$27 million
OBJECTIVE	Reduce poverty and malnutrition by increasing incomes of small producers who participate in the value chains. Generate behavior change so that the increases in income are sustainable and lead to improvements in nutritional status of beneficiary households over the short, medium, and long term.
DESCRIPTION	RVCP ANACAFÉ plans to work with approximately 102 cooperatives (60 involved in coffee, 26 in horticulture, 16 in handicrafts) focusing on the following five components: • Improving value chain competitiveness • Increasing participation in these value chains • Improving agriculture productivity • Increasing the productivity of crops grown for home consumption and improve food utilization • Improving competiveness of the handicrafts value chain Additionally, the project has five cross-cutting themes, including education and capacity building, business development, financial services, communications, and links with local and national government.

* ANACAFÉ 2012.

METHODOLOGY AND DATA COLLECTION TOOLS

SPRING conducted field visits and consultations with a range of stakeholders, including implementing partner staff, input suppliers and buyers, and producer cooperative members. During these interactions, SPRING aimed to identify opportunities along the three specific commodity value chains of coffee, green beans, and handicrafts to reduce or mitigate the underlying causes of undernutrition. SPRING used the pathways diagram (Figure 1) as a framework to organize its findings and provide recommendations based on where current RVCP interventions are situated relative to the pathways diagram.

The study included a document review, focus group discussions, and key informant interviews. Primary data collection consisted of key informant interviews with the staff of AGEXPORT and ANACAFÉ as well as with nutrition partners Fundación de la Caficultura para El Desarrollo

Rural (FUNCAFÉ) and Instituto de Nutrición de Centroamérica y Panamá (INCAP). Individual interviews were also conducted with buyers and suppliers to the surveyed cooperatives. Focus group discussions were held with farmer and producer cooperatives, especially those for the coffee and green bean value chain activities. Documents reviewed included activity monitoring plans, requests for applications, and work plans. This review provided the investigators with a comprehensive overview of project goals, interventions, methods, and monitoring strategies. The document review also provided clarity on geographic targeting, as well as how the activities intended to complete both the agricultural and nutritional components of their work. Appendix 2 provides a schedule of the interviews.

SPRING developed key informant interview guides for the various stakeholders. Key questions related to the following themes[5]:

- What do the target value chains look like: What markets do they reach? Who are the involved stakeholders? What is the enabling environment?
- How do the two activities support the value chains: What interventions do they include? What technologies are they introducing? What types of training and capacity building are employed? What support mechanisms are present along the value chain? How does activity support fit into food, health, and market systems? What is the activity measuring to know whether interventions are on track?
- What have the various stakeholders witnessed in their own lives with respect to income, production, food security, empowerment, health, or livelihoods since beginning to participate in the activity?

VALUE CHAIN SELECTION

For this study, SPRING and the implementing partners worked with three specific value chain commodities in coffee, handicrafts, and horticulture. An assumption underlying the selection of these value chain commodities was that due to the strong export market for these commodities, efforts to strengthen each step of the value chain would result in improved income for the range of actors involved, especially for smallholder producers or home-based artisans. It was further assumed that an increase in income would contribute to an improvement in nutritional status among participant households. In other words, the income-to-food and health services purchase pathways would be the primary avenues for linking agriculture to nutrition in these activities.

For horticulture, the export product of green beans was chosen because it is one of the two primary crops grown by a majority of AGEXPORT-supported producers. Two cooperatives in Quiché, Asociación Integral de Desarrollo Agrícola (AIDA) and Asociación Agros Ixil (Agros Ixil), were selected for participation in the activity due to their availability and size differences. Agros Ixil, in Santa Maria Nebaj, is the larger of the two, with 400 members, and is certified by GLOBALG.A.P. (GLOBALG.A.P. 2014). AIDA, in Cunen, is smaller, with 97 members and no certifications.[6] The two cooperatives are further described in Table 3.

5 For the full questionnaires, see Appendix 3.

6 Obtaining certification is expected to increase the prices paid by buyers, raise the quality of production, and thus make cooperatives' products more attractive to buyers.

Table 3. Comparison of the AIDA and Agros Ixil Cooperatives

CHARACTERISITC	ASOCIACIÓN INTEGRAL DE DESARROLLO AGRÍCOLA (AIDA)[7]	ASOCIACIÓN AGROS IXIL[8]
Location	Cunen, Quiché	Santa Maria Nebaj, Quiché
Number of members	97 (30 of whom are women)	400 (350 are active members, 75 of whom are women)
Land cultivated with green beans	25.57 hectares	8.69 hectares[9]
Green bean yield	211.89 quintales/hectare[10]	125.89 quintales/hectare
Price paid by buyers in quetzales (Q)	Approximately Q367 per quintal (US$47.88 per 100 pounds)	Approximately Q250 per quintal (US$32.62 per 100 pounds[11])
Certification	Not certified	GLOBAL G.A.P. certification[12]
Crops grown for export	85% green beans and 15% peas	Mostly peas and some green beans
Other crops grown	Corn and beans by all Also about 30 members targeted for family plots	Beans and corn and small amount of carrots and potatoes[13]
Payment schedule	Every two weeks	Producers are paid once a year at the end of harvest; the buyer pays the cooperative every 15–21 days
Irrigation	All have irrigation; only 2% have drip irrigation	60% have irrigation; about 18% have drip irrigation
Buyers	Siesa buys 70%; Quatros Pinos and San Juan buy 30%.	Siesa[14]

7 AIDA. 2014. Interview with SPRING. September 3.

8 Agros Ixil. 2014. interview with SPRING. September 4.

9 Green beans are not the primary crop produced by Agros Ixil, accounting for the smaller number of hectares.

10 The numbers for "land cultivated with green beans" and "green bean yield" were provided from the monitoring data of AGEXPORT, not from the interviews. It is unclear from the interviews why AIDA, which is not certified, is producing a significantly larger quantity of green beans per hectare than Agros Ixil, which is not certified.

11 This is less than AIDA reported being paid, even though both cooperatives have the same buyer and Agros Ixil is certified and AIDA is not. It is unclear whether the lower figure is simply the result of AIDA's reported payment being from buyer to the cooperative and Agros Ixil's was from cooperative to producers.

12 G.A.P. stands for good agricultural practice; GLOBALG.A.P. is the worldwide standard that assures it. GLOBALG.A.P. sets voluntary standards for the certification of agricultural products around the globe and certifies those that comply.

13 Agros Ixil tried selling locally but did not have good results: Prices were not fixed prices locally and the quality of the products was not high enough to sell them in Guatemala City markets. Agros Ixil is significantly decreasing the acreage planted with these crops.

14 Siesa is one of Guatemala's leading agro exporters, handling crops such as runner beans, string beans, green peas, garden peas, mangetout peas, fava beans, broccoli, and asparagus.

Table 4. Comparison of Cooperativa Integral Agrícola El Porvenir and Asociación Agrícola y de Dessarrollo Integral Bitenám

CHARACTERISITC	COOPERATIVA INTEGRAL AGRÍCOLA EL PORVENIR[15]	ASOCIACIÓN AGRÍCOLA Y DE DESSARROLLO INTEGRAL BITENÁM [16]
Location	Jacaltenango, Huehuetenango	Concepción Huista, Huehuetenango
Number of members	383 coffee-producing members (40 of whom are women)[17]	370 members (135 of whom are women)
Average planted land per member	Approximately .7 hectares[18]	Total area planted is 67.2 hectares, 32.2 of them certified organic
Average coffee yield	Approximately 12 quintales per farmer	Total production was 3,000 quintales in 2013, with 1,175 certified[19]
Price paid by buyers	No fixed price. In 2013, the average price was Q1,026 per quintal, with the cost of production at Q800 per quintal	No fixed price. In 2013, the average was Q850 per quintal for conventional coffee, with the cost of production at Q700 per quintal
Certification	Certified Fair Trade, Utz, Starbucks[20]	Fair Trade and organic[21]
Other crops grown	Corn and beans	Corn and beans[22]; 42 members have family plots on which they cultivate additional crops
Payment schedule	Once a year in May	Regularly throughout the season, with the last payment in May
Irrigation	Not available	ANACAFÉ provides drip irrigation for 42 family gardens
Buyers	The cooperative sells to a federation and the federation finds the buyers	Coffee Atlas and Café Import

Coffee was selected because it is the primary focus crop for ANACAFÉ and is the crop with the highest earning potential for ANACAFÉ clients. Two coffee cooperatives in

15 Cooperativa Integral Agrícola El Porvenir. 2014. Interview with SPRING. September 5.

16 Asociación Agrícola y de Dessarrollo Integral Bitenám. 2014. Interview with SPRING. September 8.

17 Nearly 200 additional members of the cooperative receive credit but are not producers.

18 During the interview this was given in manzanas, with approximately 1 manzana planted per farmer and a total of 96 manzanas planted, with 46 of them certified organic.

19 This was 50 percent less than the previous year due to coffee rust.

20 The only premium is 6 cents per pound for the Fair Trade certification.

21 It costs Q80,000 each year to maintain certifications: an additional US$130 per quintal (US$40 for Fair Trade and US$90 for organic).

22 AIDA used to have buyers for broccoli and carrots but stopped producing these crops because of high shipping costs: the markets for exports are too far away, and local markets do not pay enough.

Huehuetenango—Cooperativa Integral Agrícola El Porvenir, in Jacaltenango, and Asociación Agrícola y de Dessarrollo Integral Bitenám, in Concepción Huista—were selected by ANACAFÉ due to the cooperatives' availability. Table 4 shows the two cooperatives's characteristics.

The handicrafts value chain is a smaller focus for both of the RVCP activities and represents a new source of nonagricultural income with high levels of demand. AGEXPORT selected one handicrafts cooperative, COPITEM, which was also chosen because of its availability.[23]

At each cooperative, SPRING conducted focus group interviews with members of the board of directors, member producers, RVCP technicians (both agriculture and nutrition), and, in some cases, representatives from the largest buyer, Siesa. SPRING also met with staff from The Mayan Store, one of the handicrafts buyers in Guatemala City.

LIMITATIONS

SPRING spoke with a variety of stakeholders from both the RVCP staff and the three main value chain categories. However, the sample size was small and the selection was based partly on availability and location. During SPRING meetings, a number of producers remained relatively quiet and did not answer many questions. Absence of active participation from producers could be due to a lack of fluency, as the conversations were in Spanish, which is not the native language for all participants, or because the discussions were in groups rather than one-on-one. Individual interviews, with translators present, may have drawn deeper information from producers. Additionally, one assumption going into the work—that producers would be earning additional income tangible in their daily lives—proved not to be true, for both coffee and horticulture value chain participants. As a result, some questions were not relevant, and the team reconceptualized some of its initial goals.

FINDINGS

The findings of this study reveal opportunities to incorporate nutrition-sensitive agriculture thinking and interventions across the RVCP activities, as well as within the enabling environments of each commodity value chain. However, it is important to note that many specific findings were based on opinions voiced during focus group discussions and interviews, and did not emerge from a large-scale evaluation or research project.

Although the primary objective of both activities was to increase incomes for value chain participants, coffee and green bean producers reported that they had not perceived a noticeable increase in household income. SPRING was unable to obtain income-related monitoring data; therefore, it is not known whether these households experienced an *actual* increase in income. On the other hand, handicrafts producers perceived increased earnings and identified an impact on household investments and priorities. Additionally, green bean and coffee producers in the participating cooperatives are paid annually, at the end of the harvest, which might influence their recall and perception. For year-round cash flow, many producers reported relying on loans from the cooperatives, with interest rates of approximately 18 percent.

23 Unable to reach COPITEM because of strikes, SPRING met with one of its producers and its handicrafts coordinator and specialist in Guatemala City. COPITEM is located in Momostenango, Totonicapán, and has 52 members, 32 of them women.

The horticulture activities lack a standardized set of messages about best agricultural practices, although each cooperative staffs technicians who are available to provide trainings and support farmers. The technicians noted that with improved techniques, production on the currently cultivated land could significantly increase. There is not significant incentive for increasing production of green beans, however, as the green bean market is saturated. Following the 2013 harvest, producers destroyed a portion of their crop, as they did not have buyers who could purchase all of it. Nonetheless, cooperatives did not appear to have a plan to diversify either their buyers or the types of crops that they are producing. Small greenhouses were identified as an opportunity to grow new crops, such as asparagus, which are demanded by their buyers. Technologies such as coffee pulpers and dryers that would allow producers to process crops at the cooperative level were noted as methods to ensure consistent quality and avoid waste. However, these technologies were not widely available, nor were the methods promoted or requested by the farmers.

The technologies promoted in cooperatives are limited. AGEXPORT encourages green bean producers to use plastic mulch sheeting. Incorporating this practice decreases the need for weeding, but there is not a strategy for safe disposal of the plastic. A drip irrigation component, introduced in some green bean cooperatives, reaches only a small percentage of producers: 2 percent in one cooperative, and 18 percent in another. Technologies or interventions focused on decreasing women's workload or the number of hours a day that women work are not included in project activities.

Most of the cooperatives do not process products on-site. Green beans are collected by the buyer and sorted at a factory, with the rejected portion destroyed. The few cooperatives that process horticultural products at the cooperative level did not participate in this study. Coffee producers complete most of their own drying and pulping at home. In 2013, a percentage of the crop was lost because coffee fermented when a rainy harvest season made it impossible for farmers to dry the beans.

The value chains have few, if any, links to local markets. Although horticulture cooperative members noted demand for horticulture products, farmers believe that local markets do not pay well. Farmers prefer to grow products with a buyer who will guarantee prices and pay freight costs. Producers mentioned that they keep some of their crop to consume at home. Additionally, there seems to be interest in the home garden component that both activities promote for home consumption, but many producers lack sufficient land or water to grow everything they consume at home, and instead prioritize export crops.

Members of every cooperative interviewed identified soil erosion and deforestation as one of the greatest challenges facing local farmers and communities. Water availability over the long term is another concern. Participants from primary buyer Siesa mentioned that the main motivation for working with cooperatives located a significant distance from their factory is the cooperatives' access to community water sources for irrigation, as community water sources are lacking in many areas close to Guatemala City. None of the cooperatives has a strategy in place to address the challenges of deforestation, lack of water, or soil erosion.

Although handicrafts comprise the smallest value chain, the AGEXPORT activity is revitalizing handicrafts traditions that had nearly disappeared in the Western Highlands. This revitalization has resulted in new jobs for young people and an additional source of regular income. Unlike

horticulture producers, handicrafts producers are unable to meet demand and are learning to create high-quality products. The potential for growth is large, and a ready market exists. A business plan that includes a cost structure is needed, as RVCP activities have not calculated projections for linking improved production capacity, costs, and markets. Previously, producers have been forced to incur a loss when selling products, as they were unaware of production costs when initially accepting the work.

NUTRITION-SENSITIVE OPPORTUNITIES ALONG THE VALUE CHAIN

The following section discusses opportunities to improve nutrition sensitivity that are highlighted in the above findings.

Inputs

There is an excellent opportunity for producers to utilize technologies and improved inputs that will improve resiliency, increase productivity, and save time. For example:

- **Drip irrigation technology** could increase yields and save time if fertilizers were added to water.
- Building **greenhouses** would allow producers to diversify crops, expand the growing season, and increase agricultural earning potential and availability of diverse crops for home consumption.
- Because all farmers grow corn and beans for home consumption, use of improved or **biofortified seeds** could lead to production of more resilient or more nutritious crops.
- Expanded testing of **coffee varieties** could increase resilience for producer households, which would combat the decimation of coffee production due to the coffee rust plague.

Production

Both coffee and green bean producers stated that enhanced agricultural practices would increase their yields, therefore maximizing their potential resources and facilitating an increase in farmers' earnings and consumption in a sustainable way. Coupled with additional interventions, production methods can be nutrition-sensitive. For example, improved production methods can lead to increased income. If education around improved production methods were paired with lessons in farm budget management and financial services, farmers could make informed spending decisions with this additional income. Similarly, improved production methods can lead to decreased time and labor demands. If education around social protection were paired with education in improved farming methods, the increase of time and decrease of labor demands could lead to women's empowerment. Producers and cooperative leaders noted a lack of knowledge and capacity in regard to training methods. Therefore, both AGEXPORT and ANACAFÉ may consider increasing their emphasis on basic training around improved agricultural practices as a central component of their work plans. New elements or practices that could be promoted include:

- Improved crop management practices such as shade management and pruning of coffee plants, or more efficient spacing and timing of planting green bean seedlings. These practices

increase yields and provide farmers with more crops to sell, therefore increasing their income. If the promotion of these improved crop management practices were paired with education on the use of the farmer's income, farmers' nutrition-sensitive practices may increase. Example improved spending behaviors affecting nutrition-sensitive practices include:

  - Increased purchase and consumption of nutrient-rich foods by producer households
  - Saved income through safe-savings mechanisms to ensure that funds are available for regular and emergency health care
  - Investment in labor or time-saving technologies that protect the health and well-being of women

- Incorporating **intercropping and improved crop rotations** to help producers expand market opportunities, conserve soil, and improve household consumption of a diversity of nutritious foods. Intercropping or crop rotation could also enable families to continue planting family plots that they have had to leave fallow due to insufficient land, water, or time.
- Introducing improved **water and soil management practices**, such as agroforestry, to mitigate erosion. These practices can also help maintain nutrients in the soil, which studies have shown can improve nutrient density in crops for consumption. More efficient use of limited water would also help sustain and protect water sources, thereby contributing to safe food and water sources.
- Ensuring **safe storage** and application of **agricultural chemicals** to avoid harmful health effects, especially among women, infants, and children, in communities and minimizing runoff into public water sources.

Processing and Storage

Processing at the cooperative level is a potential opportunity for both green bean and coffee producers. A few examples and suggestions for cooperative-level processing and storage follow:

- Empowering cooperatives to take on more of the **post-harvest and presale processing** activities, such as sorting and grading, so that rejected green beans could remain in the communities for sale in local markets or home consumption, rather than be destroyed.
- Leveraging excess or diversified production to create **new value-added products** to sell in local markets. Formative research to determine types and sizes of packaging that may encourage local purchase of nutritious horticultural commodities could increase producers' income-earning opportunities. These new products could generate employment opportunities, especially for women, the landless, and members of female-headed households.
- **Bulk drying and pulping** of coffee during wet seasons could decrease waste caused by fermentation. An added benefit to this practice would be the decrease of processing wastewater runoff into local streams. This runoff pollutes water sources that are used for household consumption.

Marketing and Retailing

Marketing and retailing practices create opportunities for improved nutrition at the community and household levels within the horticulture value chain. A few examples of marketing and retailing practices that could impact nutrition habits include:

- **Expanding and diversifying the number of domestic and international buyers** to improve farmers' bargaining power and reduce producers' risk. This expansion and diversification would also allow producers to contribute to the availability of more diverse and affordable nutritious foods in local markets as products that may not meet export standards could be well suited for local consumption or small-scale processing activities.
- **Tapping into local markets** to increase both producer earnings and the availability of diverse foods. A business plan detailing the costs of pursuing a wider diversity of buyers and markets would demonstrate whether producers would find targeting these markets profitable.
- **Dissemination of simple messages** focused on the importance of purchasing and consuming healthier foods. This dissemination would aim to launch a movement or campaign toward healthier diets and could occur via businesspeople, local leaders, mass media, and shopkeepers.

Consumption

Home gardening, coupled with nutrition education for targeted beneficiaries, is the only intervention currently aimed at improving consumption practices. This intervention is especially important to coffee producers, who may have a limited amount of land available for food crop production. However, diet and consumption practices could be improved through a variety of methods. A few options for facilitating this improvement include:

- The development of a strategy to **increase local demand for nutritious foods.** For instance, local business people and leaders could model consumption of nutritious foods while creating local market opportunities. This could make healthy foods more affordable, and thus improve dietary diversity among community members.
- **Increase household participation in home gardening**, and encourage local sales of surplus production to enhance household dietary diversity and boost the proportion of household income controlled by women.
- **Expand messaging** that promotes proper consumption and feeding practices, especially among households with children. Producer cooperatives, processors, and other businesses operating within any given value chain could facilitate the establishment of policies and practices that maximize women's time and enhance their ability to care for very young children. For example, businesses could provide on-site child care services as well as the time and space for breastfeeding infants and feeding young children.

Waste

In the target areas, awareness of environmental pollution and the effects of agricultural inputs and practices on the health and safety of the natural resource base is low. Waste management is a key concern, and producers should capitalize on opportunities for improvement. For example:

- **Probiotics** could be used to expedite waste materials' composting process. Waste materials produced from coffee processing are a problematic regional pollutant. Probiotics would reduce the time needed for decomposition and the demand for chemical fertilizers. Technical assistance on the use of probiotics could improve target areas' environmental health and save money for producers.
- Creating a plan for the **safe disposal of plastic mulch sheeting** as a key production practice would contribute to the maintenance of environmental health.

CONCLUSION

More evidence and practical examples are needed to enhance opportunities to make value chain activities more nutrition-sensitive. Promisingly, Feed the Future projects include a number of value chain activities that can be studied to test assumptions and identify better practices and opportunities for improvement in such efforts. There is still a lack of clarity around what the roles and responsibilities of value chain activities should be in terms of nutrition outcomes, as well as what the value chains should measure and how. Instead of funding activities with separate streams for agriculture and nutrition interventions, the opportunity exists for more multisectoral work that improves the nutrition sensitivity of any value chain, regardless of the commodity's nutritional content. Good agriculture practices can be nutrition-sensitive in and of themselves and can yield increased production of diverse foods, improved soil and environmental health, increased incomes for male and female producers, and more time available for mothers to spend caring for their families.

Although reaching households is important for achievement of maternal and child nutrition results, opportunities for linkages to nutrition need to be considered well before reaching the household level. Identification of nutrition-sensitive actions to be performed by the range of actors and organizations within any given target value chain—from input suppliers to processers and buyers—as a part of activity design ensures a strengthened enabling environment for nutrition improvements at the household and individual levels.

For value chain activities to achieve the most nutrition-sensitive outcomes, they need to increase production and income for producer households. Furthermore, these activities should empower women by taking into account women's control of resources, their time, and their energy expenditures. The opportunities described in this report provide possible leverage points for increasing nutrition sensitivity of the value chains and open the door for discussion of further developments for Guatemala and other Feed the Future country portfolios that will contribute to improved nutrition and agriculture outcomes.

APPENDIX 1: SUMMARY OF THE AGRICULTURE-NUTRITION PATHWAYS

PRODUCTION » CONSUMPTION PATHWAY

Household food production is critically important to the diets and nutrition of individuals in smallholder farmer households. The decisions that farmers make about crop and livestock production are affected by many factors, including potential market prices, relative costs and risks associated with each product, the assets and endowments of the land the household possesses, and family needs and preferences. If preferred foods or varieties are not consistently available, affordable, or accessible in markets, raising or growing them may be the most efficient way to obtain them. In general, however, it is not the primary objective of an agricultural livelihood to produce all of the foods that a family needs; in fact, most poor rural families are net purchasers of food. Food production affects the type, quantity, and seasonality of food available in the household for consumption. Production influences the availability and prices of diverse foods in local markets.

INCOME » FOOD AND HEALTH CARE PURCHASE PATHWAY

Establishing and maintaining successful small farming businesses that ensure livelihoods is critical for reducing poverty in rural areas. The income pathway assumes that nutrient-dense, diverse foods are available and affordable in local markets, so appropriate inputs must be available and affordable to support local production of these diverse foods. Additionally, market and transportation systems must be established to enable year-round and/or seasonal supplies based on consumer preferences and purchasing power.

The effect of income on nutrition is not direct or easily predictable. It varies based on what is available, affordable, and convenient to purchase; who decides what is purchased; and the myriad factors that drive those decisions. All rural farm households must balance spending decisions between farm production and marketing investments on one hand, and the immediate purchase of food, health, care, and education necessities on the other. Purchasing power is greatly affected by income, prices, and the quantity and quality of food available in the market. Local supply and demand may also be influenced by social and behavior change (SBC) interventions, nutrition knowledge, and social marketing, which may help drive consumer preferences.

WOMEN'S EMPOWERMENT PATHWAY

Women's empowerment incorporates multiple aspects, including the decision-making power related to income, time, labor, assets, and knowledge and preferences of female community members. Increasing the agricultural income that women can control strengthens the income pathway to nutrition. Often, the best way for women to influence how household income is spent is by earning their own income. Control of household income may be shifted by changing the nature of the household's agricultural livelihood, or by intra-household behavior change that promotes equitable decision-making as well as making food and health care purchase decisions that prioritize

maternal and child health and nutrition. Here, the influence of other household members, such as mothers-in-law, must be considered.

Agricultural development interventions can strongly affect women's use of time as well as their labor burden. Women are typically responsible for a wide range of household and agricultural tasks, including their own self-care, child and infant care and feeding, and other household chores. Activities that influence the amount of time or labor women spend on agriculture-related tasks can affect their own health and energy expenditure and their nutritional status. This is important because women's good health is an input to improved agricultural outcomes as well as to their family's health and wellbeing. Woman-friendly labor-saving technologies, labor-sharing arrangements to ease the energy and time burdens on pregnant and breastfeeding mothers, and innovations to provide proper child care services while women are at work can all contribute to improved maternal and child health and nutrition outcomes.

THE ENABLING ENVIRONMENT FOR THE PATHWAYS

The three pathways discussed above are conceptualized at the household and individual levels. However, an enabling environment influences individual and household access to food, health, and care. The key components of this environment include the food market; natural resources; health, water, and sanitation; and the community's knowledge and norms around health and nutrition.

Food Market Environment. The food market environment affects the kinds of foods available for consumer purchase as much as those likely to be produced by farm households as a response to price signals and market incentives. The food market environment determines what surplus from household production is sold and what is consumed. The markets' physical location may also influence household access to diverse, nutritious foods. Finally, government policies and private sector actions affect the availability and affordability of food in the market.

Natural Resources Environment. The natural resources environment, especially soil, water, and climate, determines the types of crops and livestock that households produce for sale or for their own consumption. The influence of the natural resources environment is especially relevant in the context of shortened crop seasons, floods, and premature harvests, which cause yields to decline and make household agricultural income more variable. The lack of access to productive agricultural lands affects household livelihoods and food security status, particularly for women, because cultural norms and/or political influences are less supportive of letting women share scarce natural resources. In addition, forcing women to farm distant or undesirable land imposes additional time and labor burden on them. The natural resources environment may also harbor harmful agricultural by-products, such as agrochemicals, as well as microbes from livestock and other pollutants and disease vectors that have immediate and long-term effects on health and nutrition. Appropriate management of natural resources is critical to successful farming.

Health, Water, and Sanitation Environment. Nutritional status and agricultural production are strongly influenced by the health, water, and sanitation environment and access to health services. Illness and poor health—whether or not they result from agricultural practices—may affect household agricultural productivity as a whole. For example, food production and income generation are compromised by a lack of labor in households or communities experiencing

chronic or seasonal illness. Therefore, nutrition-sensitive agriculture must consider agricultural activities' potential effects on health, water, and sanitation.

Knowledge and Norms. Family and community knowledge, norms, and values have a major bearing on household agriculture and nutrition decisions. Activities that promote nutrition and health knowledge may affect food production, purchase, and consumption decisions that at once enhance positive outcomes for agriculture and nutrition sectors while avoiding negative impacts. Decisions that result in improved market access and income for farm households require knowledge and skills in production, storage, processing, selling, and marketing, to name a few of the many areas in which farmers are expected to be "experts." The knowledge and use of key agricultural practices and skills can easily include information that builds awareness of health and nutrition and protects against harm. SBC activities promoting nutritious diets and healthy practices—whether provided within an extension system or as part of a collaboration with other sectors—can enhance the impact of agriculture activities on nutrition.

.

APPENDIX 2: INTERVIEW SCHEDULE

MONDAY SEPT 1	TUESDAY SEPT 2	WEDNESDAY, SEPT 3	THURSDAY SEPT 4	FRIDAY SEPT 5
Meet with INCAP Meet with AGEXPORT coordinators (Carlos Uriza and Julio Dominguez) Meet with AGEXPORT M&E staff	Visit COPITEM (handicrafts value chain) ***Canceled due to road closure/ strike***	Visit AIDA–AGEXPORT green bean value chain Meet with AGEXPORT technicians and specialist (Wilmen), INCAP promoters, cooperative producers and board of directors	Visit Agros Ixil–AGEXPORT green bean value chain Meet with cooperative board of directors, AGEXPORT technicians and specialist (Wilmen), and INCAP promoters	Visit Cooperativa Integral Agrícola El Porvenir–ANACAFÉ coffee value chain Meet with ANACAFÉ technician (Enrique Sarat), cooperative board of directors, producers

MONDAY SEPT 8	TUESDAY SEPT 9	WEDNESDAY SEPT 10	THURSDAY SEPT 11	FRIDAY SEPT 12
Visit Asociación Agrícola y de Dessarrollo Integral Bitenám–ANACAFÉ Meet with ANACAFÉ technician (Rony Castillo), cooperative board of directors, FUNCAFE technicians	Meet AGEXPORT horticulture buyer Siesa **** Meeting canceled***	Meet AGEXPORT handicraft buyer The Mayan Store (COPITEM buyer) Meet with AGEXPORT horticulture specialist, coordinator, and COPITEM producer	Workshop with AGEXPORT, ANACAFE, INCAP, and Mission staff	Debrief with Mission staff

APPENDIX 3: QUESTIONNAIRES FOR IMPLEMENTING PARTNER STAFF AND COOPERATIVE GROUPS

KEY INFORMANT INTERVIEWS: RVCP STAFF

A. DESCRIPTION OF THE TARGET VALUE CHAINS

MARKETS AND MARKET POTENTIALS

1. What markets does this value chain (VC) target/reach? How large is this market, and what are the peak periods of demand?
2. How does the project maximize market benefits to producers? To input suppliers? To buyers? To consumers?
3. What impact does this VC have on local markets?
4. What value addition (if any) is required by this market? Where in the VC is value addition done and who benefits?

BUSINESS ENABLING ENVIRONMENT (LOCAL, NATIONAL, INTERNATIONAL)

1. What types of social, business, or partner networks function within this VC? How do these support (or detract from) the goals of the cooperatives/cooperative members?

GOVERNANCE (RELATIONSHIPS, POWER, CONTROL)

1. What are your perceptions as to how income-related decisions are being made within beneficiaries' households? How involved are women in income-related decisions: savings, expenditures, etc.?

B. ORGANIZATIONAL MECHANISMS EMPLOYED BY THE VALUE CHAIN AND DESCRIPTION OF HOW THE PROJECT SUPPORTS THE TARGET VALUE CHAIN

INTERVENTIONS

1. What activities and/or messages undertaken with and/or delivered to VC members have some linkage to health, safety, time saving, labor saving, or management of finances/budgets? What is your perception as to whether these activities or messages are applied by members within their homes as well as toward their livelihood/business?

TECHNOLOGIES

1. What kinds of improved inputs and production technologies are being introduced, and what training is in place related to the use of these technologies? Is any thought given to whether these technologies might reduce nutrient loss or lead to greater nutritional quality in foods or more savings in time or labor—for women, in particular?

2. What agricultural practices are being promoted for green bean or coffee production? For post-harvest handling? Packaging? Transport? Sale?

3. How have the technologies contributed to increased income? How are you measuring this?

4. How are improved seeds and other local foods (developed, for example, by INCAP) being used? Are these improving the nutrition for export crops, for home garden crops, or for crops meant for local markets? What messaging and distribution mechanisms does the project use? Are clients using these seeds? Is the project measuring use and nutritional outcomes?

SUPPORT MECHANISMS/NETWORKS PRESENT AT EACH STEP OF THE VALUE CHAIN AND HOW THEY FIT INTO BROADER FOOD, HEALTH, AND MARKET SYSTEMS, INCLUDING SOCIAL AND BUSINESS NETWORKS

1. For each VC: Can you provide information on sales, volume, and number of growers and producers involved? Can you walk us through the production and marketing cycle for [name VC]? What other livelihood activities might be taking place in the homes of the cooperative members throughout this cycle?

2. What mechanisms or approaches are being used to engage women? What benefits are expected from this engagement? How well do you think your program has done in reaching and benefiting women?

3. Have cooperative members seen an increase in their income? What have they spent that money on, and how do they decide?

4. To what extent do you think the income earned has translated to improved food security and/or dietary diversity within homes?

5. What happens to commodities or products that do not meet export standards? Are there additional buyers, and do they enter local markets? Are producers' family members consuming these products? Does the project encourage consumption of these products? How?

6. How much processing is done by the producers, and how much by other actors?

7. What are the labor practices within processing plants? On farms? For handicrafts workers?

C. HOW THE ORGANIZATION WORKS WITH DIFFERENT STAKEHOLDERS

ROLES AND RESPONSIBILITIES AND IMPRESSIONS FROM EACH LEVEL OF STAFF REGARDING PROJECTED OUTCOMES (AND MENTION OF NUTRITION)

1. Can you explain the specific roles of INCAP, Save the Children and other partners?

2. Do you refer clients to these partners or other organizations or services? If yes, in what instances have you done so?

3. What role do private sector companies play with respect to grower cooperatives? How do these private sector companies benefit from the project?

4. Provide a copy of the list of the private sector companies receiving technical assistance from the project. What activities do they do, and what type of technical assistance do they receive?

5. How does the project work with the Quatros Pinos cooperative? How does the work of Quatros Pinos cooperative vary from the work that AGEXPORT is doing?

6. Are cooperatives and farmer groups encouraging their members to invest in clean water? In home improvements (and what type of home improvements)? In more diverse diets? In labor-saving technologies (and which ones, and to whose benefit in the household)? In anything else?

7. What nutrition messages are being promoted by INCAP and by STC? Do they have a uniform set of messages and a behavior change strategy? How are these messages delivered, and to whom? What is your impression as to the effectiveness of this work? Why?

8. Do AGEXPORT, ANACAFÉ, and partners have any regular meetings to share findings, discuss problem solving, and coordinate interventions?

9. How do input suppliers, processors, and buyers interact with AGEXPORT and ANACAFÉ? How do they interact with cooperative leaders and with producers?

D. CONSTRAINTS, OPPORTUNITIES, AND POTENTIAL IMPACTS ASSOCIATED WITH NUTRITION LEVERAGE POINT(S) WITH AND THROUGH EACH VALUE CHAIN ACTOR

1. What constraints and opportunities does the project have to overcome with respect to:
   a. The Government of Guatemala
   b. Infrastructure
   c. The capacity of clients
   d. Certification
   e. Links to markets
   f. Other

2. What natural resource, financial, human resource, physical, or geographic constraints do cooperatives face? What are the opportunities?
   a. Probe toward issues relating to time, caring capacity, education, water/sanitation, health status, access to health/financial/education/other services, sustainable resources, etc.
   b. Probe toward the quality and quantity of land/soils and diversity of food/crop production.

3. What constraints are faced by farmers who join the cooperatives? How do they make decisions about what to grow and how much? What opportunities have come from being part of the cooperative? Are constraints and opportunities different for men than for women? In what way?

4. Are there differences in how women can take care of their children if they work in the handicrafts value chain rather than the horticulture value chain? Do they work at home? If so, does working at home give them more time with their children?

5. What care practices does the project promote for women who work in the value chains? For example: Do women bring their children when they work in the field? Is there child care? What about for women who work at home making handicrafts (or if their fields are at home)? Are there break times for breastfeeding or complementary feeding? Are women taught about washing hands and food before feeding children?

6. What are your perceptions as to how women's involvement in this program may have influenced the amount of time they spend on:

   a. Activities within the home versus activities outside the home

   b. Caregiving activities (such as exclusive breastfeeding, food preparation, child feeding, quality time spent with children)

7. What are your perceptions as to how women's involvement in this program may have influenced beneficiaries' health care–seeking behavior (e.g., use of maternal and child health clinic services such as family planning, prenatal care, postnatal care, growth monitoring, and immunization)? What changes have you noted among female program beneficiaries?

E. KEY MEASURES AND METRICS AND FREQUENCY AND SOURCE OF DATA COLLECTION

1. Review monitoring systems; understand content, frequency of reporting, and who receives different types of regular reports.

2. What types of data are you collecting? How and how often do you collect these data? How do you determine what data to collect?

3. What do you do with the information, and who is it shared with within AGEXPORT and the cooperatives?

4. What type of information is provided to AGEXPORT and ANACAFÉ by the cooperatives? What do they do with this information?

5. Are you looking at the data's quantity and quality implications? Do you refer your clients to your partners, to health care facilities, or to other Western Highlands Integrated Program (WHIP) partners if they are late with deliverables or are not attending trainings and need support?

6. Have increases in quantity and quality of production been measured?

KEY INFORMANT INTERVIEWS: COOPERATIVE LEADERS/MEMBERS

A. DESCRIPTION OF THE TARGET VALUE CHAIN

MARKETS AND MARKET POTENTIALS

1. What markets does this value chain (VC) target/reach? How large is this market, and what are the peak demand periods?
2. What benefits do producers get from the project?
3. What impact does this VC have on local markets?
4. What value addition is required by the exporters? Where in the VC is value addition done and who benefits?
5. What quality and quantity standards are required by the market for this product? Do any of these standards have relevance to hygiene or sanitation? How are producers and buyers holding each other accountable for these standards?

ACTORS AND THEIR RESPECTIVE (AND OVERLAPPING) ROLES

1. Are cooperatives and farmers' groups encouraging their members to invest in clean water? In home improvements? In more diverse diets? In labor-saving technologies (and which ones, and to whose benefit in the household)?
2. How do you interact with input suppliers, processors, and buyers?

BUSINESS ENABLING ENVIRONMENT (LOCAL, NATIONAL, INTERNATIONAL)

1. What types of social, business, or partner networks function within this VC? How do these support (or detract from) the goals of the cooperatives/cooperative members?

GOVERNANCE (RELATIONSHIPS, POWER, CONTROL)

1. What is the governance structure of the farmer's group/cooperative? How does leadership get identified? How is leadership strengthened? What role, if any, do female members have within leadership structures? What are your perceptions as to how income-related decisions are being made within beneficiaries' households? How involved are women in income-related decisions: savings, expenditures, etc.?

B. ORGANIZATIONAL MECHANISMS EMPLOYED BY THE VALUE CHAIN AND STEP-BY-STEP DESCRIPTION OF HOW THE PROJECT SUPPORTS THE TARGET VALUE CHAIN

1. How many technicians work with VC producers? How often do they visit? What topics do they cover? Do they make field visits or work only from the cooperatives?
2. What labor-saving technologies does the project promote? Are women using the technology? Do they feel that they are working less and saving time?

3. How are improved seeds and other local foods (developed, for example, by INCAP) being used?
4. What kinds of improved inputs and production technologies are being introduced? What kind of training is in place related to use of these technologies?
5. Does the project do any messaging related to use and investment of income? If yes, what are the messages and how are they extended?
6. Are there any interventions related to decision-making and control of income earned by women who participate in the [specify] VC?
7. What hygiene and sanitation practices does the project promote in the context of agriculture "good practices"? Are there interventions to encourage the practice of these behaviors in home garden activities? What about in home food preparation, feeding practices, or other daily activities?
8. What kinds of interventions does the project promote to improve post-harvest handling and storage of crops? Are there interventions that consider how to decrease nutrient loss post-harvest? Do you use these methods with home gardens also?
9. Can you walk me through a typical household cash flow calendar and indicate where and when VC commodity sales are contributing?
10. How do family members of clients get involved with the VCs? Spouses, children, etc.? Do they all work in the fields? Do some members provide child care?
11. Payment mechanisms: How often do cooperative members get paid? What determines timing and amount of payment, and in what form is payment remitted?
12. What agricultural practices are being promoted for green bean or coffee production? Post-harvest handling? Packaging? Transport? Sale?
13. How many women attend cooperative meetings regularly? Are any of the cooperative's leaders women?
14. Have cooperative members seen an increase in their income? What have they spent that money on, and how do they decide?
15. Can cooperative members purchase inputs in local markets, or do they always obtain them from the cooperative?
16. To what extent do you think the income earned has translated to improved food security and/or dietary diversity within homes?
17. What happens to commodities or products that do not meet export standards? Are there additional buyers, and do they enter local markets? Are family members of the producers consuming these products? Does the project encourage consumption of these products?
18. How much processing is done by the producers, and how much by other actors?
19. What happens to wastewater from coffee processing and from horticulture crops? What technologies are used to treat effluent and coffee pulp?

C. CONSTRAINTS, OPPORTUNITIES, AND POTENTIAL IMPACTS ASSOCIATED WITH NUTRITION LEVERAGE POINT(S)

1. What constraints do the cooperatives face? What are the opportunities?
2. What constraints are faced by farmers who join the cooperatives? How do they make decisions about what to grow and how much? What opportunities have come from being part of the cooperative? Are constraints/opportunities different for men than for women? If so, which ones?
3. What care practices does the project promote for women who work in the VCs?
4. What are your perceptions as to how women's involvement in this program may have influenced the amount of time they spend on:
    a. Activities within the home versus activities outside the home?
    b. Caregiving activities (such as exclusive breastfeeding, food preparation, child feeding, quality time spent with children)?
5. What are your perceptions as to how this program has influenced women's empowerment? What changes have you noted among female program beneficiaries?

E. KEY MEASURES AND METRICS AND FREQUENCY AND SOURCE OF DATA COLLECTION

1. What type of information is provided to AGEXPORT and ANACAFÉ by the cooperatives? What do the cooperatives do with this information?
2. Have increases in quantity and quality of production been measured?

REFERENCES

ANACAFÉ (Guatemalan National Coffee Association). 2012. Project Description, Rural Value Chains Project. Washington, DC: Feed the Future.

Bhutta, Z. A., J. K. Das, A. Rizvi, et al. 2013. "Evidence-Based Interventions for Improvement of Maternal and Child Nutrition: What Can Be Done and at What Cost?" *The Lancet* 382(9890):452–77.

Bhutta, Z. A., A. Tahmeed, R. E. Black, et al. 2008. "What Works? Interventions for Maternal and Child Undernutrition and Survival." *The Lancet* 371(9610):417–40.

Feed the Future. 2011. *Guatemala: FY2011–2015 Multi-Year Strategy*. Washington, DC: Feed the Future. Available at http://www.feedthefuture.gov/sites/default/files/country/strategies/files/GuatemalaFeedtheFutureMultiYearStrategy.pdf (accessed May 11, 2015).

Food and Agriculture Organization (FAO) of the United Nations. 2102. *Making Agriculture Work for Nutrition: Synthesis of Guiding Principles*. Rome/Geneva: FAO. Available at http://www.fao.org/docrep/018/aq554e/aq554e.pdf (accessed November 25, 2014).

GLOBALG.A.P. 2014. "About Us." Available at http://www.globalgap.org/uk_en/who-we-are/about-us/ (accessed November 25, 2014).

Hawkes, C., R. Turner, and J. Waage. 2012. *Current and Planned Research on Agriculture for Improved Nutrition: A Mapping and Gap Analysis*. A Report for DFID. London: Leverhulme Centre for Integrative Research on Agriculture and Health/University of Aberdeen/Center for Sustainable International Development.

Herforth, A., and J. Harris. 2014. *Understanding and Applying Primary Pathways and Principles: Brief 1, Improving Nutrition through Agriculture Technical Brief Series*. Arlington, VA: USAID/Strengthening Partnerships, Results, and Innovations in Nutrition Globally [SPRING]. Available at http://www.jsi.com/JSIInternet/Inc/Common/_download_pub.cfm?id=14340&lid=3 (accessed November 25, 2014).

Herforth, A., A. Jones, and P. Pinstrup-Andersen. 2012. *Prioritizing Nutrition in Agriculture and Rural Development: Guiding Principles for Operational Investments*. A Health, Nutrition, and Population Family (HNP) Discussion Paper. Washington, DC: World Bank. Available at http://dyson.cornell.edu/faculty_sites/pinstrup/pdfs/wbdec2010.pdf (accessed November 25, 2014).

Ruel, M. T., H. Alderman, and the Maternal and Child Nutrition Study Group. 2013. "Nutrition-Sensitive Interventions and Programmes: How Can They Help to Accelerate Progress in Improving Maternal and Child Nutrition?" *The Lancet* 382(9891): 536–51.

United Nations Children's Fund (UNICEF). 2009. *Tracking Progress on Child and Maternal Nutrition: A Survival and Development Priority*. New York: UNICEF. Available at http://www.unicef.org/publications/files/Tracking_Progress_on_Child_and_Maternal_Nutrition_EN_110309.pdf (accessed May 11, 2015).

U.S. Agency for International Development (USAID) Guatemala. 2011. Request for Applications (RFA) Number: RFA-520-11-000003 Rural Value Chains Project. Available at http://www.grants.gov/web/grants/search-grants.html (accessed November 25, 2014).

U.S. Agency for International Development (USAID). 2014. *Multi-Sectoral Nutrition Strategy 2014–2025*. Washington, DC: USAID. Available at http://www.usaid.gov/sites/default/files/documents/1867/USAID_Nutrition_Strategy_5-09_508.pdf (accessed November 25, 2014).

Webb, P. 2013. *Impact Pathways from Agricultural Research to Improved Nutrition and Health: Literature Analysis and Research Priorities*. Rome: FAO. Available at http://www.fao.org/fileadmin/user_upload/agn/pdf/Webb_FAO_paper__Webb_June_26_2013_.pdf (accessed November 25, 2014).

SPRING
Strengthening Partnerships, Results, and Innovations in Nutrition Globally

LINKING AGRICULTURE & NUTRITION

PATHWAYS | PRINCIPLES | PRACTICE

SPRING is working with USAID Missions to understand and apply a set of agriculture–nutrition pathways and principles. Through targeted technical assistance and knowledge-sharing, this work aims to improve the design, implementation, and monitoring of Feed the Future activities.

Visit us: www.spring-nutrition.org/technical-areas/ag-nut