Designing Nutrition-Sensitive Agriculture Activities

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PURPOSE: To design or refocus agricultural value chain projects to be nutrition-sensitive, and to determine what effects agricultural and livelihood programs have on the nutritional status of highly vulnerable households.

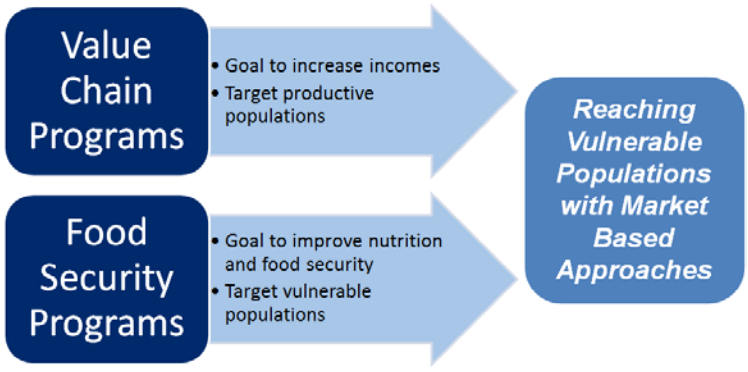
I. Introduction

Agriculture and nutrition are linked at all stages of the food value chain, from production to markets to final usage by the food consumer. However, agricultural value chain programs and nutrition programs have different goals. The former aims to raise incomes through increased production, improved quality, improved storage and greater efficiency, which result in higher prices, while nutrition programs aim specifically to improve nutritional status.

Strategies to improve nutrition within agricultural value chain programs have traditionally been driven primarily by the nutrition sector. To achieve positive nutrition outcomes within an agricultural value chain project, nutritionists analyze localized macronutrient and micronutrient deficits and select "nutrition" crops to address those specific requirements. This one-sided approach often neglects the priorities of agricultural programs, such as increased production, improved market linkages and increased incomes, which may or may not work with "nutrition" crops. In contrast, agricultural programs focus on increasing incomes and improving availability of food for the food insecure (who are often nutritionally vulnerable), but these interventions alone have not been sufficient to improve nutrition.[1]

Improved food production and market availability do not ensure that nutritionally vulnerable populations will consume more nutritious foods. Households may instead choose to buy more processed, convenient or less-nutritious foods. Furthermore, improvements in post-harvest handling or storage could lead to losses in the nutrient content of crops. While recent years have seen successes in increased agricultural production and improved linkages along the value chain, most agricultural programs have had limited to no impact on reducing malnutrition because they often do not address the underlying determinants of nutritional status, such as the consumption of required micro- and macronutrients, quality

Figure 1: Previous program design (split goals) versus current program design



[1] International Food Policy Research Institute. 2011. "Agriculture for Improving Nutrition and Health" 2020 Conference Brief 9. Washington, DC.

of care practices, the surrounding hygiene and sanitation environment, and availability of health services.

At the G8 Summit in July 2009, global leaders committed to "act with the scale and urgency needed to achieve sustainable global food security." The best strategy to meet these objectives through a single program remains elusive, but donors, including USAID through Feed the Future, are working to integrate the goals of increased incomes and improved nutritional status. These types of programs require new design approaches to achieve these multi-sectorial results through predominantly agricultural activities.

How do we improve nutritional status within agricultural programs designed to prioritize increased income and increased production? How do we leverage economic growth activities engaging food and cash crop value chains to improve nutritional outcomes? Can we work at higher levels of the value chain (such as end markets, the private sector or exporters) to affect nutritional outcomes of smallholder farmers or the most vulnerable populations, most of whom do not participate in the value chain except at the earliest production stages or as end consumers?

These questions have led this author to design a tool that integrates nutrition sensitivity into value chain and economic growth programs. The purpose of this tool is to collect crucial data that allows a program to design context-specific nutrition-sensitive activities. Building on previous research, this paper will provide background on the integration of nutrition and agriculture, and then discuss the development of the tool, each of its four components, and the results of the initial pilot. It ends with next steps and conclusions.

A. Key Concepts

1. Underlying determinants of nutrition

Determinants are most often "risk factors," which may or may not be direct causes of malnutrition. According to UNICEF's Framework of the Determinants of Child Nutrition, the underlying determinants include: access to food, maternal and childcare practices, water and sanitation, and health services. Determinants most likely to be affected by agricultural value chains are diet diversity and food security through availability and access to food; increased incomes, reduction in women's workload, and improvement in child care practices; clean, safe water and improved health status of women; and seasonality of income and women's control or influence over the use of income. Improvements in underlying

Figure 2 Definition of Food Security

FOOD SECURITY DEFINED

USAID definition of food security: "When all people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life" The integration of the value chain approach and food security is presented in terms of four recognized pillars of food security:

1. Consistent *availability* of appropriate food from domestic production, commercial imports or donors
2. Individual *access* to appropriate food from expending income or other resources
3. Proper *utilization* of food, as determined by proper food processing and storage techniques, adequate knowledge and application of nutrition and child care techniques, and adequate health and sanitation services
4. Constant *stability* of food ensures that households and communities have the ability to maintain sufficient nutrition over time.

determinants improve the conditions that allow for good nutrition.

2. Food security versus food and nutrition security

Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritional food to meet their dietary needs and food preferences for an active and healthy life (see figure 2). However, the focus of food security programs has often been on quantity of energy calories with minimal attention given to the quality of those calories or to micronutrients.

In recent years the term "food and nutrition security" has been informally introduced to highlight the importance of improved nutrition as a final outcome and not just increased energy calories.

For the purpose of this paper, the term "food security" will be used to include all four pillars with a focus on nutrition quality and not just quantity.

3. Direct nutrition versus nutrition-sensitive agricultural programming

There is consensus on the definition of direct nutrition programming, as shown in the 13 interventions laid out by the Lancet 2008[2] series (see figure 3). These activities are clearly defined, implemented and measured.

Figure 3

13 direct nutrition interventions (presented in the Lancet 2008 series)

1. Promotion of breastfeeding
2. Complementary feeding
3. Improved hygienic practices
4. Vitamin A supplementation
5. Zinc supplements for diarrhea management
6. Multiple micronutrient powders
7. De-worming
8. Iron-folic acid supplements for pregnant women
9. Iodized oil capsules
10. Salt iodization
11. Iron fortification of staple foods
12. Prevention and treatment of moderate undernutrition with special foods
13. Treatment of severe undernutrition with ready-to-use therapeutic foods (RUTF)

Defining nutrition-sensitive agricultural activities has been more challenging and contentious. "Nutrition-sensitive" refers to interventions or development efforts that, within the context of sector-specific objectives, also aim to improve the underlying determinants of nutrition, or at least aim to avoid harm to the most nutritionally vulnerable populations and individuals.[3] For example, nutrition-sensitive agriculture could include a focus on diversifying crops to include more nutrient-dense foods.

[2] Bhutta, Z. A.; Ahmed, T.; Black, R. E.; Cousens, S.; Dewey, K.; Giugliani, E.; Haider, B. A.; Kirkwood, B. et al. (2008). "What works? Interventions for maternal and child undernutrition and survival". *The Lancet*, Volume 371. 2008.

[3] The World Bank. 2013. *Improving Nutrition through Multi-Sectoral Approaches.* Washington, DC.

A 2012 paper by Anna Herthforth[4] proposes eight principles important in most cases for nutrition-sensitive agricultural activities (See figure 4); these principles have received support as an accepted working definition of nutrition-sensitive agricultural programming.

Figure 4

Nutrition-sensitive agricultural activities

1. Incorporate nutritional concerns into the design and implementation of agricultural policies, projects and investments.
2. Target nutritionally vulnerable groups,
3. Invest in women.
4. Increase year-round access to diverse, nutrient-dense foods.
5. Protect health through water management.
6. Design poverty-reduction strategies explicitly to benefit nutrition.
7. Create enabling environments for good nutrition through knowledge and incentives.
8. Seek opportunities to work across sectors.

B. The influence of agricultural or livelihood programming on food security

Agricultural value chain programs influence food security primarily by improving availability of and access to foods on the market or at the household level by improving production, storage and/or preservation; decreasing costs; increasing crops grown at home; or improving incomes that allow for purchase.

Increased production, which increases food availability, can be achieved by decreasing input costs for smallholder farmers and introducing labor-saving techniques that give better returns on investments while still decreasing or maintaining the costs of the product in the market. However, it is important to remember that increasing production or availability alone does not translate to improved nutrition. For example, increasing the production and availability of staple foods can drive prices down in the marketplace. While this can lead to improvement in general food security, it does not correlate to improvements in nutritional status. A decrease of cost in the market for staple crops could cause a very vulnerable household to change its consumption patterns to eat more of the lower-cost staple but less high-quality, diverse foods.

Increased income is often another main goal of agricultural value chain projects. The assumption has been that if farmers have increased incomes they will have improved household nutrition. This has not proven true[5]; there are studies, however, indicating that increasing income controlled by women can in fact lead to improved household nutritional status.[6]

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[4] Anna Herthforth, Jones, Andrew, and Pinstrup-Anderson, Per. (2012*) Prioritizing Nutrition in Agriculture and Rural Development: Guiding principles for operational investments*. International Food Policy Research Institute. Washington, DC.

[5] International Food Policy Research Institute. 2011. "*Agriculture for Improving Nutrition and Health"* 2020 Conference Brief 9. Washington, DC.

[6]Ruth Meinzen-Dick, Julia Behrman, Purnima Menon and Agnes Quisumbing. 2012. "Gender: A key dimension linking agricultural programs to improved nutrition and health." In *Reshaping Agriculture for Nutrition and Health,* ed. Fan, Shenggen and Pandya-Lorch, Rajul, chapter 16. International Food Policy Research Institute, Washington, DC.

While agricultural value chain programs have not traditionally focused on utilization at the household level there are some basic activities these programs can incorporate to improve overall food security:

- Analyze program activities to ensure that they do not do harm especially to the most vulnerable households. For example, mechanizing crop production can lead to increased gains in both availability and access; however it may take jobs away from the most vulnerable households, further pushing them into food insecurity. Hence it is important to avoid the potential harm of mechanization by increasing other economic opportunities for vulnerable households.
- Use value chain programs to provide entry points for nutrition education. Through different programs, a household might hear similar messages delivered through farmer co-ops, extension workers and farmer trainings.
- Reaching other gatekeepers of household nutrition, such as men who primarily control household income, in addition to direct caregivers will allow messages to be better adopted by all members.
- Use value chain programs to link farmers with other programs, such as water, hygiene and health programs.
- Improve household income decisions and investments (made by men and women jointly), e.g., to re-invest profits in agriculture, improve household diet diversity; invest in children's education, etc.
- Investigate reasons for poor nutrition leverage points along the value chain where nutrition is gained or lost to capitalize on those opportunities.

C. Tools to design and measure nutrition-sensitive agricultural programming

Practitioners continue to struggle with the question of how to design and measure nutrition-sensitive agricultural programming. Nutrition and agriculture experts agree that it is crucial to integrate nutrition and agriculture, but lack consensus on how best to do it. There are a variety of resources[7] for practitioners to use as references for integrating food security into value chains. However, there are a few tools (such as tools developed by Infant and Young Child Nutrition Program[8] and Global Alliance for Improved Nutrition[9]) that have been developed and released for public use that are intended to help programs design or re-focus agricultural programs to be nutrition sensitive. The focus of these tools has been on the design phase, including value chain selection criteria (particularly focusing on nutritional crops), mitigating harm and maximizing nutritional impact. While they are helpful, they do not incorporate or consider the main program goals of agricultural value chain programs.

[7] (http://microlinks.kdid.org/good-practice-center/value-chain-wiki/tools-integrating-value-chain-approach-and-food-security).
[8] USAID's Infant and Young Child Nutrition Project. 2011. *Nutritional Impact Assessment Tool.* Washington, DC.
[9] Spencer Henson, John Humphrey, Bonnie McClafferty. 2013 *GAIN –IDS Nutritious Agriculture by Design: A Tool for Program Planning*. Global Alliance for Improved Nutrition. Geneva, Switzerland.

These tools are well thought out and thoroughly tested in several settings with some positive outcomes. They are designed to identify current nutrition problems in order to select the value chains that will best target those issues and benefit the most vulnerable and food-insecure groups. The tools help a designer estimate the nutritional impacts of a proposed value chain on vulnerable groups and, when appropriate, propose alternative value chains with greater or equal impacts on nutrition. The tools provide standard suggestions for integration, such as nutrition education on growing, storing and preserving nutritious foods and budgeting to purchase a diverse diet.

While these tools offer some positive benefits, especially in the design phase of value chain programs, there are several design and implementation challenges that they do not meet. First, the tools focus on the most vulnerable part of the population, who face the greatest risk of malnutrition and food insecurity. However, many agricultural value chain programs are designed to work higher up in the chain with farmer co-ops, private sector entities, processors or exporters, and not directly with the most vulnerable, or even with individual farmers. These programs assume that increased incomes, productivity or marketing will have a trickle-down effect on malnutrition at the household level, but this effect is not guaranteed[10]. Many members of the most vulnerable households are not farmers participating in value chain projects, but casual laborers who must purchase 100 percent of a nutritious diet for their households.

Another challenge is that many agricultural projects must work in value chains pre-selected by the donor, and are unable to change to a more nutritious value chain. Furthermore, nutritious value chains may not offer the same return on investment, which decreases farmers' motivation to participate. If they do participate, and the nutritional value chains are not as profitable, they may not move beyond the subsistence level and the cycle of poverty will not be broken. Finally, these tools seem to require a significant understanding of nutrition, which prevents some agricultural program designers from using them.

To address these limitations this author has developed a new tool. It can be applied to new or existing programs or to programs with preselected value chains to identify ways to make them more nutrition sensitive. It is designed to identify nutritional problems in the program area and address the limitations of the program, for example: intervening at the household level for nutritional benefits; determining the root cause of food security (access, availability, utilization or stability); determining any significant varying challenges for farmers within different value chains; and determining the gap in income for households to provide a nutritious diet.

This tool has the potential to identify points along the value chain where nutrition activities can be integrated and suggest specific activities for each integration point, within the context of the program goals and target audience. The challenges are that it takes time and resources to implement this analysis, and although the data can be easily collected by trained staff, some of the analysis requires a nutritionist. The biggest challenge is to get buy in from the agriculture

[10] International Food Policy Research Institute. 2011. "Agriculture for Improving Nutrition and Health" 2020 Conference Brief 9. Washington, DC.

staff on the importance of including nutrition-sensitive activities, especially when there are no nutrition indicators in the program.

D. Nutrition-Sensitive Agriculture Tool (Nutri-SAT)

Improving program design and implementation

Nutri-SAT is used to create nutrition-sensitive agricultural value chain programs. The tool has four main components that are used to determine the best entry points for nutrition improvement within an agricultural development and economic growth program:

1. Background information, which includes reviewing other studies done to give a complete picture of the nutritional and agricultural landscape of the project and target beneficiaries and geographical area
2. Looking beyond a diet diversity score to examine the root causes of nutrition behaviors
3. Production and market behaviors of small holder farmers in key value chains
4. Cost of a minimally nutritious diet and household expenditure patterns using locally available and accepted foods

Background information is collected prior to beginning the other three components. The sequence of the other components is flexible, but since all four components are used together to form the nutrition-sensitive agricultural work plan, it is essential to conduct all four before making recommendations or changes in the program.

When used together, these components provide a more comprehensive picture of food production, purchasing, storage and consumption practices of a project's target population and their families. This information allows implementers to tailor project interventions to derive maximum nutritional impact, working within the project's existing objectives. When designing interventions, it is critical to remember that they are typically part of agricultural or economic growth projects, not nutrition-specific projects. Hence the goal is to seamlessly integrate interventions into the project to make activities nutrition-sensitive, not to turn it into a nutrition project.

1. Background information

The implementer conducts desk research on information such as: anthropometric measures; household diet diversity score (HDDS); women's diet diversity score; minimum acceptable diet (MAD) for children aged 6-23 months; household hunger scale (HHS); food access index; food consumption (percent of diet composed of major food groups); and percent of annual income spent of food. In addition, agriculture value chain information is collected, including: selection of value chains; household consumption and spending patterns; crop budgets (cost of inputs, yields, average price received for products—to determine income spent on inputs and labor for each value chain); annual income; gender dynamics in farming (land ownership, control over income, participation in decision making); etc. The data is collected from a variety of sources, including program baseline surveys, value chain analyses, gender analyses, DHS data, studies by the International Food Policy Research Institute (IFPRI), Food and Agriculture Organization (FAO) market analyses, among others. This information establishes the context of the program in which nutrition-sensitive activities will be incorporated.

2. Looking beyond a diet diversity score

The household dietary diversity score (HDDS)[11] measures the number of food groups a household consumes over a specific period of time. It is useful as a measure of food security for the following reasons:

- A more diversified diet is an important outcome in and of itself.
- A more diversified diet is associated with a number of important outcomes, such as birth weight, child anthropometric status and improved hemoglobin concentration.
- A more diversified diet is highly correlated with such factors as caloric and protein adequacy, percentage of protein from animal sources (high-quality protein) and household income.

HDDS is a good proxy measure of the socioeconomic level of a household. However, in order to really understand an individual's diet (which is what affects nutritional status directly), an individual diet diversity score (IDDS: a measure of specific food groups consumed by individuals, usually women or children 6-23 months) is necessary.[12]

Using HDDS or IDDS as part of this tool involves a two-pronged approach: 1. Measuring changes in diet diversity, specifically changes in the food groups consumed, not just the total score; and 2. Improving diet diversity through addressing specific barrier(s) determined by a barrier analysis[13]. These two components can then be used to target nutrition interventions and/or nutrition messages.

Diet diversity scores broken down by food groups and regions can be used to investigate average daily intakes. For example, if one region consumes coffee/tea, fats, grains and sugar as their main food groups (highest average in the HDDS or IDDS), there is significant room to work on messaging to improve diet diversity. However, the targeted messages might be different for a group that consumes mostly diary, grains, fats, and meat.

If the program successfully increases incomes, it should also see an increase in the overall household diet diversity score. However, by looking more closely at the specific groups that make up that score, one can also determine whether nutrition education changed the type of food groups within the HDDS that people are eating. A change from coffee/tea, fats, sugar and grains to grains, vegetables, fruits and meat, even without increased overall score, could be considered a success in improving household nutrition status. And it could also be an indication of success in improving incomes or in getting households to realign priorities for cash expenditures, since vegetables, fruits and meats are often more expensive than other foods.

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[11] Swindal, Anne and Bilinsky, Paula. (2006). Household Dietary Diversity Score (HDDS) for Measurement of Household Food Access: Indicator Guide, Version 2 . FANTA. Washington, DC.

[12] Ibid

[13] Technical and Operational Support, Food Security and Nutrition Network and CORE Group. 2011. *Designing for Behavior Change for Agriculture, Natural Resource Management, Health and Nutrition (manual).* Washington, DC.

It is also important to understand why households are not eating certain foods or food groups. Is it a problem with utilization (knowledge), access or availability? If they are not eating vegetables, it could be because they lack knowledge (or have taboos) about the importance for health, or it could be they lack access to any vegetables (too expensive to buy, not grown or sold in the market, or only available seasonally). Or they may not have enough money to buy vegetables that are available. Lack of knowledge on the importance of consuming vegetables and other barriers can be addressed at the household level with targeted nutritional behavior change. The issue of access and availability would be an agricultural program response. Production, including off-season production, can be increased through irrigation, and vegetables can be made available through storage and processing. Or incomes can be increased so that people can afford to buy vegetables year round. Hence it is extremely important to go beyond just the household diet diversity score so that the true barriers and root causes can be addressed. While it is tempting to just include nutrition messaging into every agricultural program, if the issue is something other than knowledge, such as income, messaging will have little impact on improving diet diversity.

3. Production and market behaviors of value chain smallholder farmers

This component examines production and market behaviors of smallholder farmers/producers in each of the program value chains and regions, such as what they grow/raise (including amounts or land dedicated to each crop, variety of crops grown, types of livestock), what they do with the production (sell, consume or store), other sources of food or income, and what they do with any income from selling their crops or livestock. This is not meant to be a rigorous market or production analysis but rather to look broadly at smallholder farmers in each value chains to see commonalities, differences and integration points for nutrition in order to better target the agricultural activities to have an impact on nutrition. This information is used at the beginning of a program to more specifically integrate nutrition into the agricultural activities with the intention of impacting the nutrition outcomes. This can also be conducted during an on-going program in order to refocus or more specifically entrench nutrition into the current program activities.

4. Cost of a minimally nutritious diet and household expenditure patterns

A diet is considered minimally nutritious for an individual when it covers both micro- and macronutrient requirements. This component works to determine the cost of a minimally nutritious diet per person based on individual interviews, focus group discussions and market pricing survey. Although many combinations of food could make up a minimally nutritious diet, the individual interview and focus group discussions help to identify the most commonly consumed foods in local households. This also helps determine if there are foods that are consumed at every meal, occasionally or rarely, which can affect the cost of a minimally nutritious diet through limiting the available foods to be considered for consumption. Once the minimum cost is determined, it can used to calculate out how much income a family requires to meet their nutrition needs. This can then be compared against the national average annual household income to determine whether, on average, households can afford a minimally

nutritious diet. The cost of the lowest-cost adequate diet (COD) is calculated using a model developed by Save the Children, UK[14].

The COD program uses linear programming to find the optimal solution, while respecting predetermined constraints. These constraints include the minimum nutrient and energy requirements (determined by age, sex, weight, and activity level based on household size and composition) that any diet must meet and the maximum amount of each food item that can be selected per person per week (0-21 meals), which is limited by the energy contribution each item makes to the recommended daily allowance. This varies based on the age and activity level of the beneficiaries, which are determined by the program once the family profile is entered.

The program considers the various foods in the market and, using cost, preference and age breakdown of the household, develops a diet to meet the minimally nutritious diet requirements at the lowest cost.

The main purpose of this work is to determine if households can afford a minimally nutritious diet. Therefore, the cost of the minimally nutritious diet is compared with the typical household income and non-food expenses. An idea of the affordability of the cheapest of the theoretical diets proposed by the program is obtained by comparing the annual cost of the diet per household size with the relevant annual food purchases, production, and cash income, taking into account other household expenses.

[14] SAVE the Children, UK. *The Cost of the Diet: A Practitioners Guide.* London, England.

Case Study: Ethiopia

The first pilot study of the Nutri-SAT was conducted in Ethiopia in March 2013. The tool is still under development and will be adapted based on findings from the pilot.

ACDI/VOCA conducted the pilot in the Amhara region of Ethiopia, one of four regions where the Agricultural Growth Program-Agribusiness and Market Development (AGP-AMDe) works. The goal was to see what worked, figure out where the tool needs improvement and gather basic data on its potential for assessing program activities and making recommendations within program parameters to improve nutrition outcomes. AGP-made works in six value chains pre-selected by the donor: maize, wheat, chickpeas, honey, sesame and coffee. The tool was used to examine the best ways to improve nutrition for smallholder farmers working within each value chain.

AGP-AMDe is a five-year, USAID-funded project that started in 2011. AMDe uses a value chain approach to strengthen the agriculture sector, enhance access to finance, and stimulate innovation and private sector investment. AGP-AMDe is a key component of Ethiopia's Agriculture Growth Program, which promotes economic growth in four high-rainfall regions with strong agricultural potential: Amhara, Oromia, SNNPR and Tigray.

Amhara was chosen for this pilot for two reasons: First, five out of the six value chains that AMDe works with are represented in this region. Second, the stunting rate of 24.2 percent[15] is the highest among the four target regions.

Background information

Agricultural activities depend on one long rainy season (kremt) from June to September. The main crops in Amhara are barley, rice, finger millet, maize, teff, chickpeas and vetch (part of the legume family). Maize, barley, teff and millet are the main food crops, while rice, vetch and chickpeas are the main cash crops. Starting in September, there is a second short rainy season with a short cycle of cultivation that includes chickpea and vetch. In a few cases, where irrigation is available, farmers grow some additional crops, such as horticultural crops. Harvest begins in October and ends in January. In March, households begin to expend their stored food from previous seasons, and food purchases steadily increase, reaching a peak during the lean season from June to September. Poorer households with smaller harvests intensify their search for cash income during this period, especially from paid work. The poor and very poor have to supplement their staple food consumption through purchase on the market, whereas wealthier households with more land are able to store enough staples for the entire year. This allows households that are better off to use cash to purchase food items that increase their diet diversity.

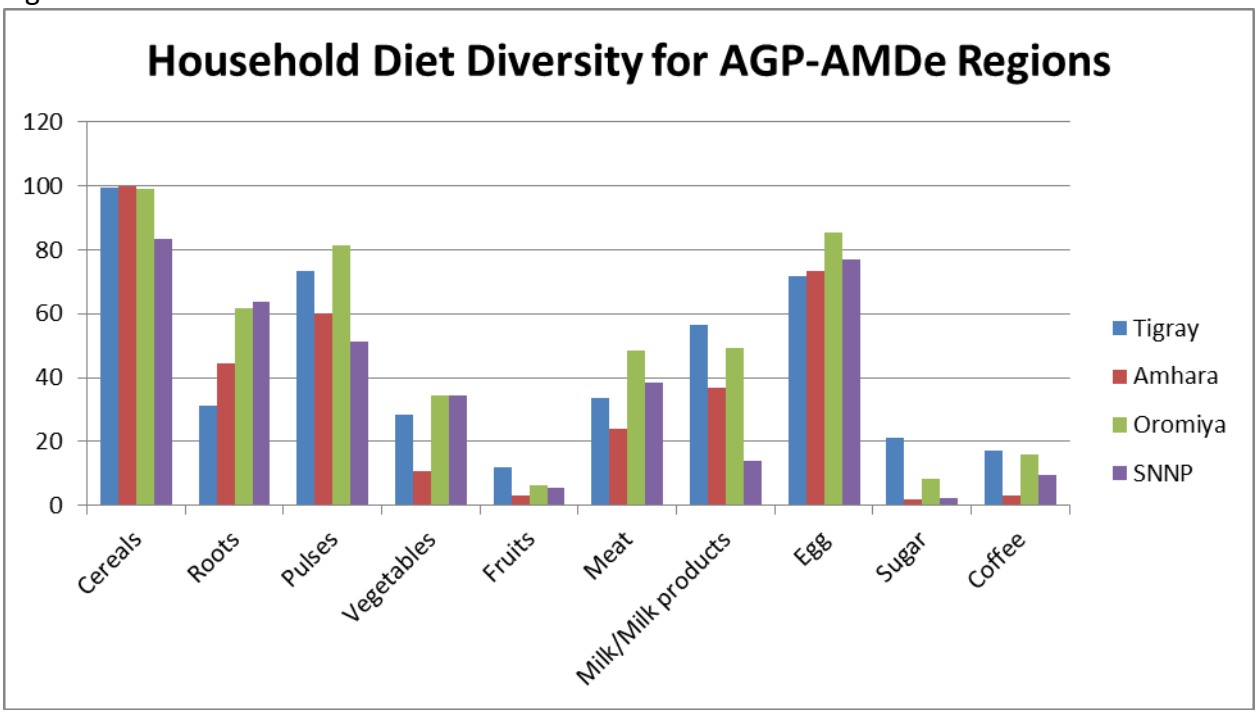
[15] Ethiopia: Demographic and Health Survey 2011

Both women and men are actors in agricultural value chains in Ethiopia. Yet their roles, responsibilities and constraints are often determined by gender norms, often to the disadvantage of women. The Global Gender Gap index ranks Ethiopia at 122 out of 130 countries in gender equality. There are numerous gender-based constraints that disproportionately affect women, particularly related to access to and control over productive resources such as land, inputs, labor, technologies, information and technical assistance, cooperative systems, extension systems, credit and water. Moreover, women are disproportionally affected by HIV/AIDS, illiteracy, gender-based violence, and by traditional practices including early marriage, rape and abduction, and large family sizes. Women also have overburdening workloads including domestic work, subsistence farming and income-generating work.

Looking beyond diet diversity score

IFPRI determined a diet diversity score of 4.2 (out of 10 food groups) for AGP-AMDe areas as part of a baseline study conducted in 2011.[16] This indicates that households are consuming less than half of the foods they need for a diverse, nutritious diet. The reporting period was over seven days. The study's diet diversity scores broken out by food groups and regions are shown below.

Figure 5



[16] IFPRI. 2012 "*Agricultural Growth Program (AGP) of Ethiopia – Baseline Report*" Addis Ababa, Ethiopia.

The chart shows that Amhara has the lowest rates in vegetable, fruits and meat consumption relies heavily on staples, which limits micronutrients in the diet. This data indicated a need to further explore the reasons why vegetable and fruit consumption are significantly lower than other food groups.

Based on these results, a barrier analysis was conducted in Amhara regions on the following behavior: "Farmers eat foods rich in vitamin A (dark-green, leafy or orange vegetables) every day." The barrier analysis was conducted over six days, with the team interviewing 39 women and 144 men. Because the barrier analysis was organized through farmer cooperative unions (FCU) the team was unable to get an equal sample of women for the study since far fewer women participate in FCUs. Because of the sample size, the women's responses were not statistically significant but the conclusions are included below because they illustrate barriers that are important to consider when designing a nutrition intervention.

Key Findings:

- Very few of men's beliefs or opinions were significantly different between doers and non-doers, indicating that men are not the primary decision makers when it comes to eating foods rich in vitamin A.
- Similar responses from men and women reinforce that leafy greens are mainly grown at home rather than purchased.
- Female non-doers are much more likely than male non-doers to say that dietary diversity is important, which indicates that knowledge is not enough to make them eat the recommended foods.

Production and market behaviors of smallholder farmers in targeted value chain

During this pilot, the team conducted focus group discussions in Amhara with five out of six of the AGP-AMDe value chains. Two focus groups per value chain were conducted, one with 6-10 male farmers and one with 6-10 female farmers. The results for all value chain groups were similar.

Key findings:

- Farmers produce a wide variety of staple crops and animals (including teff, maize, barley, millet, wheat, rice, chickens, goats, sheep and dairy cows). This is typical of subsistence farmers, who reduce risk through diversifying agriculture and livestock. It is interesting to note that only staple crops were mentioned, which seems to indicate that things grown in their home gardens were not considered part of what they "farmed."
- The co-op for chickpeas in the region is not well-established, so membership among focus group participants was low.

- Households consume the majority of the crops they grow versus selling most products. According to the IFPRI baseline,[17] an average of 75 percent of crops grown is consumed at the household level. Households earn income from selling crops between October and January, which leaves several months with no income from crops.
- The majority of income from crop sales is used to repay the money borrowed to purchase seeds and fertilizers at the beginning of the planting season
- Women own one-quarter to one-half less land and animals then men.
- Eggs are more likely to be sold compared to milk, which is prioritized for household consumption with the excess being turned into butter for sale.

Cost of a minimally nutritious diet and household expenditure patterns

The COD analysis was conducted to assess the degree to which economic constraints might prevent households in the Amhara region from having access to a nutritious diet.

The data collection and analysis set out to answer the following questions:

- What is the cost of a nutritious diet for a typical smallholder farmer in Amhara?
- What nutrients have the greatest influence on the cost of a nutritious diet?
- Are there any neglected or underutilized foods that could decrease the cost of a nutritious diet?

Six market surveys and four individual surveys and focus group discussions on household consumption patterns were conducted. Information was collected on the market price, seasonal availability and consumption patterns of all local foods (excluding herbs, spices and condiments).

With this data the cost of three theoretical diets was estimated using the COD software for a typical household of five individuals, which is the average rural family size according to Ethiopia's 2011 Demographic and Health Survey:

- The lowest-cost diet that only meets recommended average energy requirements
- The lowest-cost diet that meets recommended intakes for energy and nutrients (MNUT)
- The lowest-cost diet that meets recommended intakes for energy and nutrients based upon typical dietary habit of households in the Amhara region (LACON).

A nutritious diet for the typical family was defined as one that provides the total of the estimated average requirement (EAR) for energy; the safe individual intake of protein; 30 percent of total energy intake from fat; the reference nutrient intake (RNI) of vitamins and minerals; and the safe intake for vitamin A, all specified by the World Health Organization (2004; 2007; 2008).

[17] International Food Policy Research Institute. 2012 *"Agricultural Growth Program (AGP) of Ethiopia – Baseline Report."* International Food Policy Research Institute. Addis Ababa, Ethiopia.

Key Findings

A nutritious diet based on typical food habits is three times as expensive as a diet that only meets energy requirements. The minimum cost of an energy-only diet was estimated at 25.46 ETB ($1.36) per day and included only two out of 48 foods found in the markets. The minimum cost of a MNUT diet was estimated at 26.93 ETB ($1.43) per day and included six out of 48 foods found in the markets. The minimum cost of a LACON diet was estimated at 84.04 ETB ($4.48) per day and included 10 of the 48 foods found in the markets. The relative expense of the LACON diet is due to interview subjects' indication that they eat injera (a traditional bread made from teff, sorghum, maize or a combination) a minimum of 14 times a week, or two meals a day. Injera provides calories but minimally contributes to micronutrients or protein in the diet. Hence, the foods selected to fill that gap must be micronutrient or protein dense which are significantly more expensive.

- It is possible for a typical poor family to eat a nutritious diet using local foods, but it is difficult to meet the requirements for vitamin C, iron and calcium. These nutrients are also the most expensive and increase the cost of the diet. The food groups that contributed the most to a nutritious diet for both children aged 12-23 months and for the rest of the family were meat, fish, poultry and eggs, dairy, and vegetables, all of which are relatively expensive and, for this reason, are not typically eaten by the most vulnerable households.
- Cost limits families' ability to purchase nutritious foods. Most families depend on storing the cereals that they grow in order to have food during the lean season. The baseline study conducted by AGP-AMDe gives a mean annual food consumption of 443.75 ETB, or 1.22 ETB per day, which would not even meet the cost of the energy-only diet assuming a family purchased all of its food. According to the IFPRI baseline in the AGP regions, farmers earn approximately 4,637 ETB or $.68/day from the sale of all their crops annually, which is approximately 1/6 the cost of a LACON.
- Breast milk provides essential nutrients for a young child. In the analysis of the LACON diet for children aged 12-23 months, breast milk met over half the child's need for fat and vitamin C, and contributed substantially to energy, vitamin A, vitamin B1, vitamin B2, niacin, folic acid and calcium requirements. Additional calories for a lactating woman are incorporated into the caloric needs of the rest of the family.

Recommendations and Challenges

Using all of the key findings from each component of the pilot study, the following recommendations were made to the program.

- Develop a nutrition module for inclusion in the cooperative training curriculum activity using the barriers found to develop/adapt the messages. AMDe uses a cascade module that provides training of trainers to FCUs, which then train other farmers. Each nutrition message should be paired with an agriculture message to make them more meaningful to the farmers, for example: Including micronutrient-rich foods in the household diet will make your family healthy, just as using fertilizers will make your crops strong and healthy

- Conduct market surveys each season to better understand the seasonal fluctuations in cost and availability of foods found on the market and the potential impact on households that purchase the majority of their food from the market. The seasonal fluctuations in the daily cost of a nutritious diet have not been captured in this study, because the data collection only represents one season. In addition, the data was collected during Lent, so many foods, such as meats and dairy, were not readily available in the market, which may have led to higher-than-usual prices.
- Promote inclusion of women in FCUs, so they have access to FCU benefits, such as improved inputs, fertilizers, trainings and links to markets.

Main challenges for the Ethiopian pilot

The pilot had several logistical challenges; including problems with durability of the scales used to weigh the foods in the market and not planning enough time and/or staff to conduct the market visits. In addition the pilot was conducted during the Lent fasting period, so there was less meat and dairy products in the market. The barrier analysis was done with members of the FCUs, where women's membership is low, so the data collected was not statistically significant. And finally, the SAVE UK COD program assumes that a farmer sells all of his crops and purchases all of his food, and does not consider the amount of food the farmer stores for household consumption.

Conclusions for the Ethiopian pilot

Based on the recommendations from the Ethiopia pilot, the program has inserted activities to integrate nutrition into its agricultural programming. For example, the project is currently developing a nutrition module to be included in the cascade training approach. The program will also collect market price information every season for the life of the program to monitor the cost for a household to purchase a minimally nutritious diet.

Follow-up and monitoring will continue as the program changes and adapts based on the results of the tool.

E. Next Steps for Nutri-SAT

- Determine if market data from the Famine Early Warning Systems Network (FEWS NET) can be used in lieu of conducting seasonal market surveys. While FEWS NET only collects data on key staples, the percentage change from season to season could be used as a proxy for the market survey, which would reduce costs to the program
- Pilot use of smartphones to collect market survey data to decrease the time needed to input data.
- There are plans under way to use this tool in several other countries to test its adaptability.
- ACDI/VOCA is creating a database to manage and correlate the data collected from the studies.

F. Monitoring the success of nutrition-sensitive agriculture

AGP-AMDe recently added two nutrition indicators: Women's Diversity Score and Minimum Acceptable Diet for children 6-23 months. Combining the results of the indicators with the four components of this tool together will give more comprehensive results of the program activities. Changes in diet diversity over the course of the project are an indication of increased income or increased household-level production that frees cash to be used to purchase a more varied diet. However, when paired with looking at the specific groups that make up the diet diversity score, it can show whether there is a shift in the type of food groups consumed. This will give an indication as to whether the nutrition education paired with increased incomes or production made a difference in the household's decisions on which food groups to purchase.

Market and production behaviors show attitude changes in how cash is used, foods are stored and crops are grown.

Cost of a minimally nutritious diet shows trends of affordability over seasons and year-to-year. When paired with household expenditures and increases in income, this gives a picture of a household's ability to meet its nutrition needs. When compared to the goal of an agricultural or economic-growth program to increase incomes, this becomes a useful monitoring tool for success in creating a nutrition-sensitive program. Several external factors have to be taken into consideration when looking at the final outcomes of the project, including food price increases, and increased or decreased access to markets. Once these factors are taken into account, it can be determined if income increases were enough to allow families to afford a nutritious diet, assuming they choose it. It is important to remember that unless families have the income or resources to obtain a nutritious diet, nutritional status will not improve.

II. Conclusion

Nutri-SAT takes several common tools and combines them to give a more complete picture of the project environment. It allows a project to determine the best points to integrate nutrition into an agricultural program and the best activities or messages to target the root causes of poor nutritional status. It is important to remember that the goal of this tool is not to change the intended outcomes of an established project or to have separate nutrition activities, but to integrate nutrition into the value chain program and to target the same population. The intention is to influence household nutritional status or the intermediate determinants of poor nutrition, as an added component, even when there is not a specific nutrition indicator.

Based on the Ethiopia pilot, this tool proved useful in all of these aspects and was successfully used to design nutrition interventions that were integrated into agricultural activities. Time and regular monitoring will determine how successful these interventions will be in changing household nutritional status or the underlying determinants of nutrition.