

Nutrition Sensitive Agriculture Tool (Nutri-SAT) Ethiopian Pilot Study

Background

The relationship between agriculture and nutrition extends throughout the various stages of the food value chain, from production to markets and on to final usage by the food consumer. However, improvements along the value chain which increase income, food production and market availability do not ensure that nutritionally vulnerable populations will consume more nutritious foods, let alone experience improved nutritional status. While recent years have seen successes in increased agricultural production and improved linkages along the value chain, most agriculture programs have had limited to no impact on reducing malnutrition. This is because they often do not address the underlying determinants of nutritional status such as the consumption of required micro and macronutrients, quality of care practices, the surrounding hygiene and sanitation environment, and availability of health services.

Previous strategies to improve nutrition within agriculture programs have been driven primarily by the nutrition sector. To achieve positive nutrition outcomes within an agriculture project, nutritionists analyze localized macronutrient and micronutrient needs, and select crops to address those specific requirements. However, this approach often neglects the agricultural program's priorities, such as increased production, improved market linkages and increased incomes.

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. These types of programs require new program design approaches to achieve these multi-sectorial results through mostly agricultural activities.

For instance, to improve productivity and market linkages (which are common indicators), agricultural programs often target groups higher up in the value chain, such as large-scale producers and processors, rather than the most nutritionally vulnerable populations such as subsistence farmers who must be reached to achieve changes in stunting or other nutrition indicators. Furthermore, agriculture and livelihood activities that work toward the overarching goal of increasing income do not automatically translate into improved food and nutrition security.

How do we improve nutritional status within agriculture programs designed to prioritize increased income and increased production? How do we leverage value chains—both food and cash crops—to improve nutritional outcomes? How do we work at later stages of the value chain while also impacting nutritional outcomes among small holder farmers or the most vulnerable populations who do not participate in the value chain except at the earliest production stages or as an end consumer?

Objective

The purpose of this pilot is to test the Nutrition Sensitive Agriculture Tool (Nutri-SAT) developed by ACIDI/VOCA which is used to create/adapt nutrition sensitive agriculture programs. The tool has four main components that are used to determine the best entry points for nutrition improvement within the program. When used together they will give a more comprehensive picture of food purchasing and consumption practices of our target beneficiaries and their families. This information will allow us to tailor the interventions for their specific needs to get the most impact from the program. Since we often are working within the confines of specific program objectives these activities will be targeted to work within those specific activities. When designing activities we constantly keep in mind that we are

not a traditional nutrition program but a livelihoods or agriculture program. Hence our goal is to make our activities nutrition-sensitive.

Methods

The tool has five main components that are used to determine the best entry points for nutrition-sensitive activities within an agricultural development and economic growth program:

1. **Desk Research** collects background information and other studies done in the target region/country to give a complete picture of both the nutritional and agricultural landscape of the project
2. **Barrier Analysis** examines the root causes of the nutrition behaviors
3. **Focus Groups** determine production and market behaviors of small holder farmers in key value chains
4. **Cost of the diet (CoD)** determines the minimal cost of a nutritious diet using a market survey of locally available and accepted foods
5. **Nutrition-sensitive agricultural work plan** is developed in collaboration with agriculture and nutrition staff

Desk research was conducted prior to beginning the other four 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 ideal to conduct all four before making recommendations or changes in the program.

When used together, these components provide a 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 value chain development objectives. When designing nutrition-sensitive interventions, it is critical to remember that they are typically part of agricultural 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. Desk Research

The first step of Nutri-SAT was to conduct desk research, collecting information such as: anthropometric measures; household dietary diversity score (HDDS); women's dietary 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 on 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 was 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 established the context of the program in which nutrition-sensitive activities will be incorporated.

2. Barrier Analysis

A barrier analysis was used to examine determinants of behaviors through surveys conducted with people who were “doers” of a particular behavior and people who were “non-doers.” Research on behavior change has identified major categories of behavioral determinants. These categories include, for example, perceived social norms, perceived positive or negative consequences, and policies. The barrier analysis examines a target behavior, using the survey to ask questions related to these behavioral determinate categories in order to identify which of the behavioral determinants are most significant for that behavior. Identifying the key determinants can help program implementers to plan appropriate interventions or messages. Barrier analysis has typically been used with health and hygiene programs, and is now also being used by programs in agriculture to understand the reasons behind adoption or non-adoption of promoted agricultural techniques. Nutri-SAT used the barrier analysis in order to understand important determinants of behaviors related to nutrition, in particular, household consumption of a diverse diet.

Dietary diversity scores were collected (from IFPRI) during the desk research stage of Nutri-SAT. Breaking down these scores by food groups and regions was helpful to determine which nutrition behavior to focus on. For example, if one food group is significantly lower than others, the barrier analysis can focus on why households are not consuming that food group. The barrier analysis results may point to behavioral determinants related to utilization (knowledge), access or availability. For example, if households are not consuming vegetables, it could be because they lack knowledge about their importance for health; or it could be that vegetables are not grown, not sold in the market, or are only available seasonally; or they may not have enough money to buy the vegetables that are available.

Some barriers, such as lack of knowledge, can be addressed at the household level with targeted nutritional behavior change messages, while other barriers, such as market availability, require an agricultural program response. That response may include activities that increase off-season production through irrigation, or that improve storage and processing. For barriers related to access, effective interventions may include those that increase incomes so that households can afford to buy vegetables year round. While it is tempting to just include nutrition messaging into every agricultural program, if the barrier relates to something other than knowledge, such as income, messaging alone will have little impact on improving diet diversity.

Barrier Analysis surveys were conducted in each of the 4 regions where AGP-AMDe works. The field team attempted to collect questionnaires from 90 male doers, 90 female doers, 90 male non-doers and 90 female non-doers. However since the team focused on members of the FCU's the number of females as significantly lower than males. Hence, when compiling the data from Tigray and Amhara were grouped together and data from Oromia and SNNPR were grouped together in order to have a large enough sample to have statistically significant results.

These groupings were based on the team's evaluation that these regions were similar to each other.

3. Focus Groups

This component of Nutri-SAT used focus groups with men and women smallholder farmers to examine production and market behaviors and their relation to nutrition. The focus groups discussed topics such as what producers grow/raise (including amounts of land dedicated to each crop, variety of crops grown, types of livestock), what they do with their production (sell, consume or store), other sources of food or income, what they do with any income from selling their crops or livestock, and food consumption behaviors including taboos or foods that are never eaten. This is not meant to be a rigorous market or production analysis but rather to look broadly at smallholder farmers to see commonalities, differences and potential integration points for nutrition within the value chain project. This information is useful at the beginning of the project to plan nutrition integration into the project's agricultural activities. However, focus groups can also be conducted during an on-going program in order to refocus or identify new areas in which to more specifically incorporate nutrition into the program activities.

Focus groups could also be conducted with other value chain actors, such as grain millers, input suppliers or market retailers, to identify potential nutrition integration points at other levels of the project. Such focus group questions could also be integrated into the Value Chain Analysis that is conducted at the beginning of most ACDI/VOCA projects.

AGP-AMDe Field team conducted 2 focus group discussions per value chain crop in each region. Each group included 6-10 male farmers or 6-10 female farmers. There were a total of 19 FGD's completed.

4. Cost of the Diet

Part 4 of Nutri-SAT works to determine the cost of a minimally nutritious diet in the project region using the Cost of the Diet (CoD) tool developed by Save the Children, UK¹. The CoD tool uses a market survey to collect food price information and combines this with local food consumption patterns and nutrient requirements of a typical household in order to determine, through linear programming, the lowest cost minimally nutritious diet available in the region.

A diet is considered minimally nutritious for an individual when it covers both micro- and macronutrient requirements. Although many combinations of food could make up a minimally nutritious diet, the focus group discussions described above help to identify foods that are commonly or rarely consumed in the project area in order to make the CoD more realistic. The CoD tool can determine the lowest cost nutritious diet using unlimited amounts of all of the foods available in the market, and it can also determine the lowest cost nutritious diet with stipulations on minimum or maximum amounts of certain foods based on local consumption norms.

¹ SAVE the Children, UK. *The Cost of the Diet: A Practitioners Guide*. London, England.

ACDI/VOCA's main objective in using the CoD tool within Nutri-SAT is to determine how much income a typical family requires to meet their nutrition needs and whether households in the project region can afford a minimally nutritious diet. The cost of a nutritious diet is compared against the national average annual household income or program data collected on household income to determine whether, on average, households can afford a minimally nutritious diet, taking into consideration other non-food expenses. By using the CoD tool throughout the program to track changes in any existing gaps between income and the cost of a nutritious diet, project staff can determine whether income-raising activities are adequate to allow households to consume a nutritious diet.

AGP-AMDe field team conducted 4-6 market surveys in each region. For each market survey the team weighed every item sold in the market to determine the average price per 100 grams. For each item 3 weights were obtained from 4 different vendors at each market. So a total of 12 weights were obtained on each item in order to determine an average price in each market. Weights were taken on the smallest unit sold of each item in order to determine the cost to the most vulnerable.

5. Nutrition –Sensitive Agriculture Work Plan

Using the information collected by the first four parts of Nutri-SAT, agriculture and nutrition staff collaborated closely to create a work plan that integrates nutrition-sensitive programming into the agriculture project. To ensure buy-in from all staff members, a participatory planning workshop will be conducted in which the pathways from agriculture to nutrition are presented and discussed and the findings from the desk research, barrier analysis, focus groups, and CoD are reviewed. Using this information, the agriculture and nutrition staff analyzed the project's causal framework and value chain activities to determine potential entry points for nutrition integration, keeping in mind the program's target beneficiaries and the behavioral determinants found in the barrier analysis.

The nutrition-sensitive agriculture work plan will include goals, assumptions, strategies, activities and measurement within a detailed implementation plan (DIP). Strategies should address who the targeted beneficiaries of the nutrition-sensitive activities will be, as well as any indirect beneficiaries. Measurement will include chosen indicators to monitor the success of the integrated activities. The DIP will also include a timeline for the nutrition-sensitive activities, along with materials required and persons responsible for all stages of implementation.

Project Background

The first pilot study of Nutri-SAT was completed in Ethiopia in August 2013 as part of the Agricultural Growth Program-Agribusiness and Market Development (AGP-AMDe). The purpose of the pilot was to assess Nutri-SAT's potential as a planning tool for nutrition integration within the program's agricultural value chain activities and to create a nutrition-sensitive work plan for the AGP-AMDe program.

AGP-AMDe is a five-year, USAID-funded project that started in 2011 and is being carried out by ACDI/VOCA. AGP-AMDe uses a value chain approach to strengthen the agriculture sector, enhance access to finance, and stimulate innovation and private sector investment. It 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. AGP-AMDe works in six pre-selected value chains: maize, wheat, chickpeas, honey, sesame and coffee. ACDI/VOCA conducted the pilot in all four AGP-AMDe regions.

Ethiopia: Food Security Snapshot

- 44% of children under 5 years of age are stunted and 29% are underweight (Ethiopia DHS 2011)
- \$170 per capita income (HICES Ethiopia 2010)
- Household expenditures \$367 on food and \$211 on non-food items (AGP-AMDe baseline)

Part 1: Desk Research

Desk research involved collecting contextual information from a variety of sources, including an IFPRI baseline study² in the regions and AGP-AMDe baseline³.

The average stunting rate for the 4 regions is 47%.⁴ According to the Global Food Security Index,⁵ one of the main nutrition challenges is diet diversity. Ethiopia scores 16 out of 100 on sufficiency of food supply with 66% of Ethiopia's population below the global poverty line.⁶ The average Ethiopian spends 58% of their household income on food compared to the global average of 38%.⁷

² Guush Berhane, Mekdim Dereje, John Hoddinott, Bethelehem Koru, Fantu Nisrane, Fanaye Tadesse, Alemayehu Seyoum Taffesse, Ibrahim Worku, and Yisehac Yohannes. Agricultural Growth Program (AGP) of Ethiopia – Baseline Report 2011. International Food Policy Research Institute. November 15, 2012

³ Agriculture Growth Program- Agribusiness and Market Development Project. Household Survey. Kimetrica, 2011

⁴ Ethiopia DHS 2011. <http://measuredhs.com/publications/publication-fr255-dhs-final-reports.cfm>

⁵ <http://foodsecurityindex.eiu.com/>

⁶ <http://foodsecurityindex.eiu.com>

⁷ <http://foodsecurityindex.eiu.com>

Agricultural activities depend on one long rainy season. The main staple crops in the AGP-AMDe areas 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. 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. In March, households begin to expend their stored food from previous seasons, and food purchases steadily increase, reaching a peak during the lean season. 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.

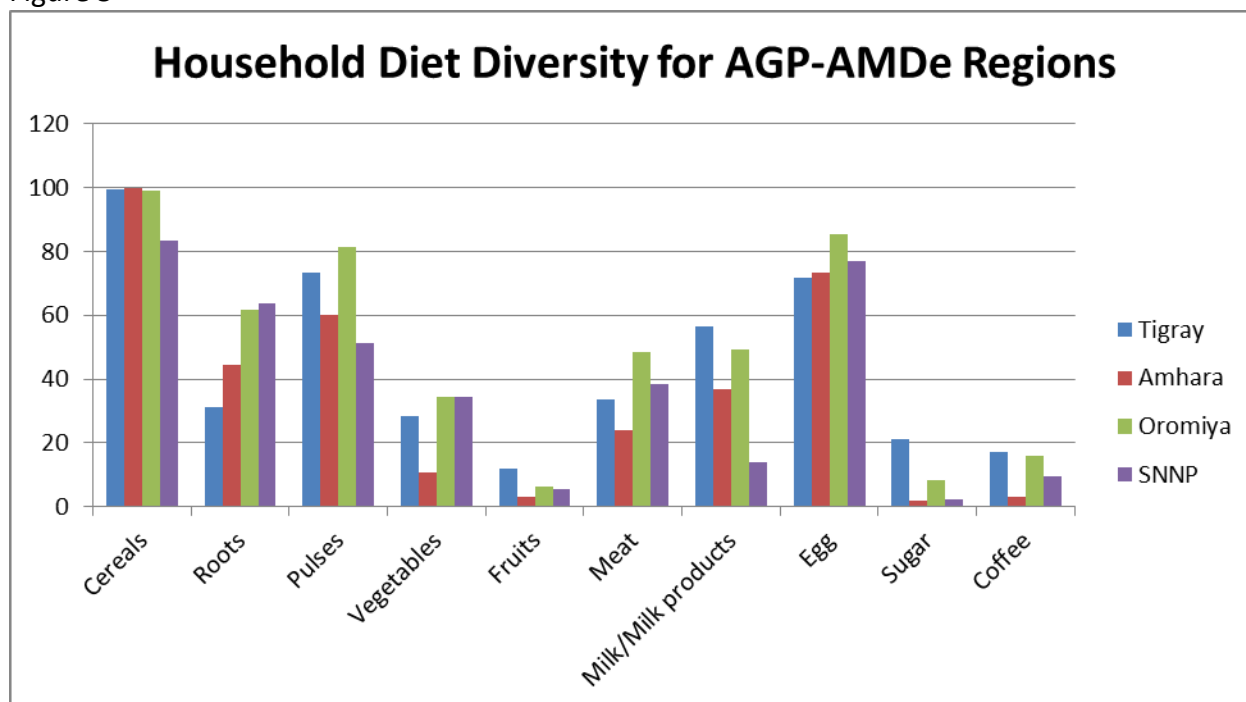
Both women and men are actors in agricultural value chains in Ethiopia, yet they frequently have different roles and responsibilities based on cultural and gender norms, which often serve to the disadvantage of women. The Global Gender Gap index⁸ ranks Ethiopia at 122 out of 130 countries in gender equality. Gender-based constraints that disproportionately affect women include access to and control over productive resources such as land, inputs, labor, technology, information and technical assistance, cooperative systems, extension systems, credit and water. Moreover, women are disproportionately affected by HIV/AIDS, illiteracy, gender-based violence, and by traditional practices including early marriage and large family sizes. Women also have overburdening workloads including subsistence farming and domestic and income-generating work.

IFPRI determined a household dietary diversity score (HDDS) of 4.2 out of 10 food groups for AGP-AMDe areas as part of a baseline study conducted in 2011.⁹ This indicates that households are consuming less than half of the foods they need for a diverse, nutritious diet. The study's diet diversity scores broken out by food groups and regions are shown below.

⁸ Ricardo Hausmann, Laura D. Tyson and Saadia Zahidi. The Global Gender Gap Report 2012. World Economic Forum. Geneva Switzerland.

⁹ IFPRI. 2012 "Agricultural Growth Program (AGP) of Ethiopia – Baseline Report" Addis Ababa, Ethiopia.

Figure 5



Household Diet Diversity Scores is calculated based on the sum total number of food groups consumed by members of the household divided by the total households in the sample. The chart above shows the break down by region for each of the food groups.

Part 2: Barrier Analysis

Based on low consumption of vegetables as indicated by the HDDS score breakdown (Figure 5), a barrier analysis was conducted in all AMDe regions on the following behavior: “Farmers eat foods rich in vitamin A (dark-green, leafy or orange vegetables) every day.” This behavior was chosen as a proxy for consumption of all vegetables or diet diversity.

The AMDe field teams led by the Nutrition Specialist and Behavior Change Specialist used to conduct this barrier analysis were previously trained as part of ongoing work. The team pre-tested the questionnaires in Addis prior to conducting in all 4 AGP-AMDe regions

Key Findings:

- Both male and female Doers and Non-Doers in all four regions demonstrated limited knowledge of the advantages of consuming vegetables rich in Vitamin A.
 - The lack of difference between the percentage of Doers and Non-Doers who provided certain responses regarding the advantages of eating these vegetables indicates that their knowledge of the health benefits of these vegetables is not a major influencing factor in their decision to eat them or not eat them.

- It is interesting that both men and women demonstrated a similar lack of knowledge, since women are traditionally targeted with health and nutrition messaging while men are not, and so women would be expected to show a higher level of knowledge.
- Current BCC messages on eating a variety of vegetables should be evaluated before designing messages for this program.
- Male Doers were significantly more likely than Non-Doers to note that eating Vitamin A rich vegetables is easier when they produced the vegetables themselves.
 - Male Non-Doers were 26 times more likely than Doers to note that it was easier to eat these vegetables when they had a good yield, which could imply that they grow these crops for sale and only keep some for consumption if there is a surplus.
- Female Doers did not mention their own production, and instead were roughly twice as likely as female Non-Doers in both the northern and southern regions to note it was easier to eat Vitamin A rich vegetables when they are available in the market.
- Female Non-Doers in the southern regions noted that the biggest difficulty impeding their consumption of Vitamin A rich vegetables was their lack of money, implying that they were unable to afford those vegetables in the market.
- It is surprising that men were more likely to indicate that consumption was fueled by their own production, while women noted that consumption was fueled by market availability.
 - This indicates that education on the benefits of consuming Vitamin A vegetables should be targeted at male farmers.
- Female Doers from the southern regions are 90 times more likely than Non-Doers to indicate that most people approve of eating vegetables rich in Vitamin A.
 - This indicates that the idea of social approval is a strong determinant of people's willingness to eat these types of vegetables.
 - Non-Doers lack of belief that vegetable consumption is socially acceptable can be supported by anecdotal evidence in which certain types of vegetables, such as leafy greens (which may even grow wild) are looked down upon as poor people food.
- Non-Doer women in all 4 regions were significantly more likely to respond that there was a high likelihood that they could become so sick that they would not be able to work.
 - Combined with the lack of knowledge on the benefits of consumption of Vitamin A rich vegetables this represents an opportunity to tie the health benefits of Vitamin A rich vegetables to the importance of consumption.

Part 3: Focus Group Discussions (FGD)

During this pilot, the AGP-AMDe field teams, led by the nutrition specialist and the behavior change specialist, conducted focus group discussions with smallholder farmers from all of the value chains present in each region of AGP-AMDe. 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. These FGD's were conducted in each value chain crop to determine if there were any major differences in behaviors between smallholder farmers in different crops. In addition women and men smallholder farmers were interviewed separately to allow activities to address any key restraints, challenges or benefits specifically to men or women.

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.
- Households consume the majority of the crops they grow versus selling most products. 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.
- 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.
- Farmers report more common method for crop storage is in bags in the home. Some mention no storage available. Some have a storage house, but say that the storage house is not protected from rats and insects.
- Main strategies for coping with the lean season were:
 - Eating different foods
 - Borrowing
 - Selling animals
 - Daily labor/work for cash or food

Part 4: Cost of the Diet (CoD)

The CoD analysis was conducted to assess the degree to which economic constraints might prevent households 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 the AGP-AMDe project?
- What nutrients have the greatest influence on the cost of a nutritious diet?

Focus group discussions and individual surveys on household consumption patterns as well as market price surveys were conducted to collect information 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 Survey¹⁰:

- Minimum Nutritious-The lowest-cost diet that meets recommended intakes for energy and nutrients
- Locally Acceptable - The lowest-cost diet that meets recommended intakes for energy and nutrients based upon typical household dietary habits in the 4 AGP-AMDe regions

Figure 6: Key Findings

Cost of Diet per day	SNNPR	Oromia	Tigray	Amhara
Family (based on 5 members)				
- Energy Only	30.89 birr	28.31 birr	36.98 birr	23.99 birr
-Minimum Nutritious	44.36 birr	35.03 birr	54.70 birr	25.21 birr
-Locally Acceptable	71.93 birr	63.40 birr	74.19 birr	59.95 birr
Child				
-Energy Only	2.60 birr	1.72 birr	2.23 birr	1.47 birr
-Minimum Nutritious	2.60 birr	1.72 birr	2.23 birr	1.47 birr
-not breastfed	5.15 birr	3.98 birr	6.06 birr	3.99 birr
Total Household				
-Energy Only	33.49 birr	30.03 birr	39.21 birr	25.46 birr
-Minimum Nutritious	46.96 birr	36.75 birr	56.93 birr	26.68 birr
-Locally Acceptable	74.53 birr	65.12 birr	76.42 birr	61.42 birr
Average across all 4 regions				
-Energy Only	30.04 birr			
-Minimum Nutritious	41.83 birr			
-Locally Acceptable	69.37 birr			

A nutritious diet based on local food habits is 2.3 times more expensive as a diet that only meets energy requirements. The relative expense of the locally acceptable diet is due to beneficiaries 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 only minimally contributes to micronutrient or protein requirements, so the foods selected to fill that gap must be micronutrient and protein dense and tend to be significantly more expensive than less nutrient-dense foods.

- Average cost of a minimally nutritious diet 7.97 birr per person (HH members over 2 years of age), plus 2 birr per person (child 6-23 months) or 41.83 birr per household per day (based on an average of all 4 regions and 5 HH members)

¹⁰ <http://measuredhs.com/publications/publication-fr255-dhs-final-reports.cfm>

- 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 the most expensive and increase the cost of the diet. Cost limits families' ability to purchase nutritious foods.
- Breast milk provides essential nutrients for a young child. If a child does not breastfeed from 12-23 months it would cost the family an average of 4.80 birr or 2.4 times more per day to meet the nutritional needs of that child.

Part 5: Nutrition-sensitive Agriculture Workplan

This pilot has helped identify barriers to change, potential integration points and activities, and value chain actors to target for improving household nutritional status. Using all of the key findings from each component of Nutri-SAT, the following recommendations for nutrition integration were made to the AGP-AMDe program. These recommended activities can influence the nutrition workplan.

- Develop and pilot a nutrition module for inclusion in the Sell More for More Training.
- Conduct the market surveys each season to better understand the seasonal fluctuations in the cost and availability of foods found on the market and the potential impact on smallholder farming household's access and availability of a diverse diet.
- Use the CoD to monitor the project's impact on nutrition by comparing the cost of a nutritious diet with any growth in average beneficiary household income, to see if income gains (including own production) attributable to the project were sufficient to enable households to afford a nutritious diet.
- Include specific training to farmers for budgeting their money from cash crops and casual labor to be able to buy a diverse diet year round.
- Promote inclusion and empowerment of women in FCUs so they have access to FCU benefits such as improved inputs, fertilizers, trainings and linkages to markets.
- Include training to FCU's for members on improved household storage of crops. This will increase year round household access and availability of food.
- Include education about the benefits of eating vegetables rich in Vitamin A.
- Explore influencing other value chain actors such as input suppliers or private sector to include nutrition messaging as part of their activities.
- Conduct focus group discussions with maize millers MGP-AMDe are currently working with to determine potential challenges to fortifying maize flour as part of ongoing work to nationalize fortification standards for maize flour.
- Conduct a barrier analysis to determine the behavioral determinants regarding household purchase of fortified foods.

Main challenges for the Ethiopian pilot

The pilot had several logistical challenges including:

- Durability of the scales used to weigh the foods in the market
- Not planning enough time and/or staff to conduct the market visits.
- Heavy rains in one region hampered the study process
- Respondent's expectation for some sort of incentives which is unpleasant and bad behavior developed among the rural community
- 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 at this point
- The pilot in one region was conducted during the Lent fasting period, so there was less meat and dairy products than usual in the market.
- The barrier analysis in was only done with members of the FCUs, where women's membership is low, so the data collected was not statistically significant by individual region
- The traders were reluctant to tell the actual price of their food items by considering the team as a controlling body of the government and took a couple of time to convince and start weighing and register the cost
- Wealth quintile data was not determined so a breakdown of availability and access by wealth quintile was not conducted.
- 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.

Monitoring the success of nutrition-sensitive agriculture

AGP-AMDe currently has no nutrition indicators but my recommendation if nutrition indicators were added would be that they are: 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. Monitoring changes in these attitudes will help determine if the nutrition sensitive activities are affective in changing behaviors.

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.

Conclusion

Agriculture is a key component to improving overall nutrition of households throughout the world. Agriculture and nutrition are interdependent on each other in many aspects. Farmers who are healthy and nutritionally strong less sick and are more productive. While agriculture has been successful in raising incomes without specific nutrition goals and activities historically this has not translated into improved household nutritional status. Hence it is critical that agriculture projects include a nutrition component to reach its full potential of improving small holder's income and nutrition status of their families simultaneously. While many will focus on the importance of every agriculture project to include nutrition crops for home consumption, it is the belief of this author that while that can play an important role, it is not the only way to accomplish improvement diet diversity at the household. Just as important as providing diet diversity a household must also become self-sufficient through improved incomes and crop production. Hence agriculture market development projects that focus on improved incomes or production can provide smallholders with improved incomes which can translate, with nutrition focused behavior change, to improved diet diversity while moving them out of poverty.

Nutri-SAT combines several common tools 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 underlying determinants of poor nutrition, as an added component, even when there is not a specific nutrition indicator.

Based on the 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. While this pilot focused on a specific point in the value chain it can be used along the entire value chain to focus activities to address the barriers, to monitor the market changes on activities and to monitor effects on the most vulnerable household's ability to improve their household diet diversity.