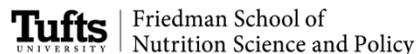


Where do all the nutrients go?

An Assessment of the Barriers and Facilitators of
Healthy Food Production, Purchase, and Consumption in
the Amhara and SNNP Regions of Ethiopia

Summary Report (Revised)
November 2019



Friedman School of
Nutrition Science and Policy



List of Acronyms

AEW	Agricultural Extension Worker
AEZ	Agro-Ecological Zone
AGP	Agriculture Growth Program
AMIYCN	Adolescent, Maternal, Infant, and Young Child Nutrition
AT	Assessment Team
ECC	Early Childhood Care
ENGINE	Empowering New Generations to Improve Nutrition and Economic Opportunities
ET	Evaluation Team
FGD	Focus Group Discussion
GtN	Growth through Nutrition
HDA	Health Development Army
HEW	Health Extension Worker
KII	Key Informant Interview
LSMS-ISA	Living Standards Measurement Study, Integrated Surveys on Agriculture
MF	Model Farmer
MVHH	Most Vulnerable Household
NGO	Non-Governmental Organization
PRA	Participatory Rural Appraisal
SBCC	Social and Behavior Change Communication
SNNPR	Southern Nations, Nationalities, and Peoples' Region
TBA	Traditional Birth Attendants
USAID	United States Agency for International Development
WASH	Water and Sanitation for Health

Contents

List of Acronyms	2
Executive Summary	4
Findings.....	4
Vegetable Consumption facilitators	5
Animal Source Food (ASF):	6
Factors affecting household ASF production:	6
Conclusions.....	6
I. Introduction.....	8
I.1. Background.....	8
I.2. Objectives	10
II. Methodology	10
III. Study Limitations	12
IV. Findings	13
1. Fruit	14
1.1. Factors affecting household fruit production	14
1.2. Factors affecting household fruit consumption vs sale	16
1.3 Factors affecting household decisions to purchase fruit	17
2. Vegetables	18
2.1. Factors affecting household vegetable production	18
2.2. Factors affecting household vegetable consumption vs sale	19
2.2.1. Vegetable Consumption facilitators	20
2.3. Factors affecting household decisions to purchase vegetables	20
3. Animal source foods (ASF)	21
3.1. Factors affecting household ASF production	21
3.2. Factors affecting household ASF consumption vs sale.	23
3.3. Factors affecting household decisions to purchase ASFs.	24
V. Effects of sale of production of healthy foods on household diet and food security	25
V.1. Importance of achieving quality diet in household decision-making	25
VI. General Conclusion and Recommendation	26
VI. 2. Factors Affecting Consumption of Healthy Foods through Retention or purchase of Nutrient-Rich Foods	29
VI.3. Factors Affecting the Sell of Household Production and Benefits.....	32
VI.4. Household preferences related to achieving a quality diet.....	33
VII. Conclusions.....	34
VII. Recommendations.....	35
Specific recommendations include the following:.....	36
Annexes:	37

Executive Summary

The project aims to achieve its goal of reducing stunting by 20 percent, by working with the Government of Ethiopia to enhance support provided by frontline Health and Agriculture workers, and strengthen the institutional capacity of the government partners to deliver nutrition sensitive livelihoods through social and behavior change communication (SBCC) on nutrition, WASH and agriculture-related themes.

A qualitative research plan was developed to collect data on knowledge, attitudes and practices related to household nutrition management with an emphasis on the production, consumption, retention, sale and purchase facilitators and barriers of nutrient-rich foods including fruits, vegetables and small animals. Focus Group Discussions (FGDs), Key Informant Interviews (KIIs), Transect Walks, and Technical Observations was conducted in six woredas representing three key agro-ecological zones (lowland, midland and highland) in Amhara and SNNPR.

Findings

Many factors were found to shape the production, consumption, retention, purchase and sale practices of households included in this study. Within most households, extensive and intensive decisions of whether, what and how much to produce shaped by many factors including access to labor, critical production inputs, household consumption needs, as well as financial concerns such as access to credit.

Fruit Production facilitators

The knowledge gained by MVHH about the benefits of the fruits (both financial and nutritional) provided by Growth through Nutrition is motivating factors for such groups to produce fruits. And previous experience in the production of fruit by model farmers in SNNPR and few in Amhara are the facilitating factors for fruit production.

Fruit production Barriers:

The major fruit production barrier in the highland areas of Amhara is type of soil which is not suitable for fruit production. Shortage of land and water, are also the other problem associated with fruit production in mid and low lands of Amhara region and in the lowland of SNNP. Communities' limited knowledge about fruit production, management and limited knowledge on the nutritional benefits of fruit is also common barriers both in Amhara and SNNP. In addition fluctuation of fruit price in the market and access to improved fruit seedlings for model farmers, are also another barriers to fruit production. Moreover, the perish-ability of fruits such as avocado in SNNP is also considered to play a key role in the propensity of households to produce such products.

Fruit Consumption facilitators

The presence of fruit tree in own farm is one of the main factors for fruit consumption in both Amhara and SNNPR. Although there are only few farmers who have fruit trees; study participants both in Amhara and SNNPR mentioned having own production as a major factor for fruit consumption. In addition seasonal access to fruits, knowledge, attitude and fruit price are also other main determinant factors that the household consider (either implicit or explicitly) whether the production is for consumption and/or sell.

Fruit Consumption barriers

In both Amhara and SNNPR, model farmers and MVHs who have some fruits such as avocados, Mangos and Bananas prioritize these fruits primarily for market. The main reasons for this include prioritization of financial gain and consideration of fruits as luxury than real or nutritious food.

Vegetable Consumption facilitators

The main facilitating factors for vegetable consumption in SNNP includes ownership on own farm, type of staple food consumed (Enset based food is usually combined with vegetables) and availability of alternative cash crops for sale. In Amhara region vegetable production on own farm, vegetable consumption during fasting seasons, and availability of alternative cash crops found to be a facilitating factors for vegetable consumption at the household level

Vegetable Consumption barriers

Both in Amhara and SNNP the major barriers for vegetable consumption includes; insufficient availability of vegetable in the market, priority given to sell than consumption especially when the prices of vegetable is high in the local market and also high cost of vegetable to buy from the market during dry season. In addition in Amhara lack of dietary diversification was one of the main barriers (most families mainly consume pulses and cereals) followed by, lack of production capacity, cash priority over nutritional security, basic staple food and financial insecurity are among the major barrier to consume vegetable.

Vegetable Purchase facilitators

knowledge about benefits of vegetables especially among the MVHs and model farmers who do not have access to training courses, better finances due to sale of cash crops, availability of vegetables in the market and consumption experience (SNNP) and taste Preference in some of the vegetables. Where as In SNNPR the food pattern and diversity of diet is consists of vegetables such as cabbage; however financial constraint is the main barrier that limits the ability of families, especially MVHs, to purchase vegetable. One of the women in the MVHs group mentioned that the cash shortage even forces them to divert from their normal choice or relishes by saying:

Animal Source Food (ASF):

Factors affecting household ASF production:

Animals are more than source of food for the household; they are assets, signs of affluence and insurance for financial security in many rural families. As such farmers in Amhara region forced to keep small number of animal heard since keeping large number of animals is a burden rather than an asset. Although the trend on the number of animal rearing at the household level is decreasing most male MFs interviewed in SNNP have a greater number of cattle and small animals (sheep, goat and chicken) than those in Amhara.

ASF Production facilitators:

In both SNNPR and Amhara the facilitating factors for animal production includes: animals are considered as main assets for the household, animals are source of incomes (sell of milk in SNNP and sell of butter in Amhara), availability of animal feed during the rainy season and after crop harvest, animals are also sources of healthy food, which have nutritional benefit for children and adult family members. In addition, provision of technical support, motivation and knowledge on rearing small animal provided by animal production experts/AGEWs and provision small animal for women from most vulnerable household is also facilitating factors for ASF production.

ASF Production barriers

For MVHs the main barrier for production or rearing of small animals is lack of financial capacity to acquire across both regions. The main barriers for keeping large stock of animals are shortage of communal grazing land and lack of knowledge about modern rearing methods such as cut and carry method in both regions (Amhara and SNNP)..

Factors affecting household ASF consumption vs sale.

Sale of small animals for meat is very common and is considered a very reliable source of income at critical times of cash need. Milk is not for market especially in Amhara that cattle are there for family supply of milk. In SNNPR dairy products such as cheese and ghee are sold.

ASF Purchase barriers

Across all AEZs in both regions the notion of ASF is mainly purchased and used for special occasion, low financial capacity and high cost of ASF in the local areas is the major barriers for most household to purchase animal source food for household consumption.

Conclusions

Throughout the woredas sampled in Amhara and SNNP regions, there was apparent similarity with regard to the drivers and barriers of specific behaviors as they pertain to household nutrition and diet diversity.

While women from many MVHs have begun to feed their children fruits and vegetables since they believe that these products will help their children grow strong, their knowledge with regard to production and consumption of healthy food seems to have substantially

increased as a result of the education provided to them by HEWs and AEWs. In turn, some model farmers have got a chance to attend training reported increased familiarity with new vegetable and fruit crop varieties, despite ongoing reluctance to adopt these new items into their daily consumption patterns.

Overall recipients of programmatic support for the production of nutrient-rich foods (women from MVHH) and MF were also quite pleased with the program's provision of both improved varieties of seeds and small animals for rearing at the household level and training.

However, many of the program beneficiaries perceived land shortage and pervasive water insecurity as barriers to household fruit, vegetable and animal production; this is especially the case for small animal keeping which is considered as potential for conflict with neighbors—which resulted in the inefficient use of program resources. Financial challenges were found to derive from unfavorable financial conditions for the procurement of production inputs (i.e. fertilizer and pesticide for crops, and drugs for animals), lack of access to high-quality medicines or drugs for livestock.

Recommendations:

- Resolve the misalignment of knowledge about and attitudes toward healthy food production and consumption by expanding nutrition-sensitive training within communities (using training-of-trainers and informational diffusion techniques).
- Consider introduction of more intervention like water-harvesting, digging small well, encouraging multiple use of same water to address the shortage of water specifically for MVHH.
- Introduce post-harvest technologies adapted to local context in terms of the technology's requirement which is believed to alleviate the issues regarding the perishable crops and other post-harvest loss.
- Continue and enhance engagement of highly influential individuals like religious leaders, Kebele Administrators, managers and other elders in efforts to transform community attitudes and social norms around nutritious food production and consumption.
- Invest in increasing the depth of understanding among communities about the benefits of nutritious food and expand this education to promote involvement of new community members (beyond model farmers and MVHHs).
- Build on momentum from SNNPR to improve and expand efforts aimed at creating market linkages for farmers to sell their surplus nutrient-rich crops and small animal products.

I. Introduction

Funded by USAID and led by Save the Children, the Feed the Future Ethiopia Growth through Nutrition is a five-year multi-sector nutrition and WASH Program which aims to improve the nutritional status of mothers, infants, and young children within four operational regions in Ethiopia. The program focuses on the first 1,000 days of a child’s life and aims to achieve its goal of reducing stunting by 20 percent by working with the Government of Ethiopia to enhance support provided by frontline Health and Agriculture workers. The project also aims at strengthening the institutional capacity of the government partners to deliver nutrition sensitive livelihoods through Social and Behavior Change Communication (SBCC) on nutrition, WASH and agriculture-related themes.

Tufts University is responsible for the research and learning agenda of the project aiming to refine and scale-up implementation through rigorous evidence-based policy research and evaluation. Building on a diverse body of literature produced since the project began in 2016; Tufts University commissioned JaRco Consulting to carry out operational research through cross-sectional qualitative study. The research aims at evaluating the barriers and facilitating factors that influence household nutrition practices and decision-making with regard to the production, consumption, utilization, sale and purchase of nutrient-rich foods. The study tries to understand the dynamics of household food production and dietary management in order to inform the project’s nutrition sensitive agricultural packages and SBCC strategy.

JaRco’s Evaluation Team (ET) conducted qualitative research through the collection of primary data on household decision-making in production of nutritious food and nutrition management using Focus Group Discussions (FGDs), Key Informant Interviews (KIIs), Transect Walks and Technical Observations in six woredas representing three key agro-ecological zones (lowland, midland and highland) in Amhara and SNNPR.

I.1. Background

Over the past two decades, Ethiopia has made significant strides in improving population health outcomes through the reduction of chronic child malnutrition. During this time, the nation has seen a 20 percent decrease in the prevalence of stunting in children under 5, from 58 percent in 2000 to 38 percent in 2016.¹ While such results appear promising in the fight to improve the nutritional status of the country’s approximately 105 million residents², more progress is needed to combat mother and childhood undernourishment, as well as stunting which still afflicts almost two out of five children in Ethiopia. Today, more than half of

¹ Central Statistical Agency - CSA/Ethiopia and ICF, “Ethiopia Demographic and Health Survey 2016,” 2017, <https://dhsprogram.com/publications/publication-fr328-dhs-final-reports.cfm>.

²The World Bank, “Ethiopia” (2017). Data Bank, Accessed November 28, 2018, <https://data.worldbank.org/country/ethiopia>.

Ethiopian children ages 6-59 months and one quarter of women suffer from anemia and 28 percent of child mortality in Ethiopia is associated with under nutrition.³

The implications of widespread malnutrition are significant—with heavy social and financial costs incurred across critical development sectors including health, education and the economy. A recent report estimates that Ethiopia loses approximately 55 billion ETB (2.3 billion USD) each year to child under nutrition.⁴ In response to these elevated figures, the Government of Ethiopia launched an initiative called the Seqota Declaration in July 2015 aimed at ending hunger and under nutrition by 2030.⁵ The Declaration acknowledges the role of childhood under nutrition in loss of productivity and diminished cognition, and names the agricultural sector as one of many with a vested role in combating stunting and childhood malnutrition through improved access to quality, nutrient-rich foods.⁶

The majority of Ethiopia’s undernourished children reside within four major regions in Ethiopia (Amhara, Tigray, SNNP and Oromia), where most of the rural population subsists on agricultural production. With only six percent of cultivated land currently irrigated, the annual yields of smallholder farmers are often at the mercy of environmental factors including highly variable seasonal rainfall, disease, diverse soil behavior, and pest-related damage⁷. Ethiopia also suffers from weak market linkages on both the input and output side. Farmers either cannot afford improved inputs or lack the knowledge regarding their efficient and effective use.⁸

Adequate food availability at the national, regional and household levels, obtained through agricultural crop production, domestic and international markets, and other channels is the cornerstone of nutritional well-being of for a community. At the household level, food security implies physical and economic access to foods that are adequate in terms of quantity, nutritional quality, safety and cultural acceptability to meet each person's needs. Household food security depends on sustained access to adequate income and lucrative assets, including land and other productive resources owned.

Expanding access to diverse, safe and quality foods involves increasing the production, consumption and procurement of nutrients at the household level. This entails the use of improved inputs and cultivation practices to increase yields, enhanced market availability of

³Central Statistical Agency, (2017)

⁴ Feed the Future – USAID/Save the Children, “Growth through Nutrition” Project Brochure

⁵“Ethiopia Commits to Ending Under nutrition by 2030 with the Seqota Declaration,” *SUN* (blog), July 21, 2015, <https://scalingupnutrition.org/news/ethiopia-commits-to-ending-under-nutrition-by-2030-with-the-seqota-declaration/>.

⁶ Ibid

⁷The US Government’s Global Hunger and Food Security Initiative, “Ethiopia | Feed the Future,” accessed November 28, 2018, <https://www.feedthefuture.gov/country/ethiopia/>.

⁸ Feed the Future Multi-Year Strategy, June 2011

diverse nutrient-rich foods, and the deployment of well-designed programmatic responses to food safety concerns and post-harvest losses.

However, access to nutritionally-adequate food neither guarantees adequate consumption by all individuals within the household, nor the appropriate biological utilization of the food consumed. Household food security can be translated into good nutritional status if all household members have nutrition security, a condition that combines: (1) access to nutritionally adequate and safe food; (2) sufficient knowledge and skills to acquire, prepare and consume a nutritionally-adequate diet, including that which meets the special needs of young children, pregnant and lactating women; and (3) access to health services and a healthy environment to ensure effective biological utilization of foods consumed.

In response to widespread child malnourishment in Ethiopia and the diverse set of challenges that accompany a household's decision to produce, consume and utilize nutrient-rich foods, the Growth through Nutrition project has promoted access to nutrition and production of varieties of vegetables, fruits, legumes, bio-fortified crops and small livestock, linked with social behavioral change communication (SBCC) activities to increase demand for and consumption of diverse, safe and quality foods.

I.2. Objectives

The purpose of the study is to inform Growth through Nutrition activities that support and train rural farming households on consumption and marketing of nutrient-rich foods to better ensure that production investment, as well as other market-based strategies result in positive dietary benefits⁹. ***For the purposes of the study, healthy foods are defined as nutrient-rich food including fruits, vegetables and animal-source foods.***

The specific objectives of the study are to answer the following key evaluation questions:

- 1. What factors affect household decisions to produce healthy foods?**
- 2. What factors affect decisions to consume healthy foods produced by the household rather than selling them or otherwise not consuming?**
- 3. What factors drive decisions to purchase healthy foods, given (2)?**
- 4. Do decisions to sell one's own production of healthy foods affect household food security or diet quality?**

II. Methodology

This study comprise staff from Woreda Health and Agriculture Offices, Health Extension Workers (HEWs), Agricultural Extension Workers (AEWs), Model Farmers in program

⁹ Tufts TOR for "Where do all the nutrients go? The role of Diet Quality Optimization in the Rural Ethiopian Household Food Economy"

kebeles, and respondents from Most Vulnerable Households (MVHHs), who have been provided with access to nutrient-rich production inputs by the Growth through Nutrition program. Model farmers and respondents from MVHHs were differentiated with regard to production habits. Those who produce nutrient-rich foods at home were classified as “doers”, while the term “non-doers” was applied to those who do not produce nutrient-rich foods at home. In the process of the study the ET learned that it was difficult to find representative number of “non-doers” despite all the attempts made; this has implication on the research findings. The “doers” category was further subdivided into livelihood systems production categories of fruits, vegetables, small animals, and mixed crops (entailing a combination of multiple categories) and grouped accordingly for the purpose of this research. As can be described the sampling at Household level is purposive given the category of study participants who are direct beneficiaries of the project or Model farmers who are purposively selected for their progressive agricultural practice; this makes the sampling purposive at Household level.

The study areas were representing three main agro-ecological zones: Highlands, Midlands and Lowlands in two programmatic regions: Amhara and SNNP. In Amhara, the three study woredas included Enemaye: a High land, BasoLiben: a Mid land and Takusa : a Low Land. In SNNPR, the three study woredas include Gumer: High land, Cheha: Mid land, and South Ari: Low land.

Various qualitative data collection methods were used to gather data both at the institutional and community levels which include; Focus Group Discussions (FGDs), Key Informant Interviews (KIIs), observations and transect walks. Tools were designed considering the key evaluation/research questions noted above and customized based upon respondent type and barrier analysis parameters. The research method was chosen with the goal of segmenting target beneficiaries based on agro-ecological zones, livelihood systems and their behavior/practice of production and consumption of nutritious food (doers and non-doers). In total 39 FGDs and 43 KIIs were conducted, a total of 318 community members have participated in FGD and 43 individuals were contacted for KII. In addition 16 In-depth Interview were conducted with selected women from most vulnerable household one best performer and one less performer women were selected from the women attended the MVHHs FGD . See Annex 1 for additional information on FGD and KII

Focus Group Discussions (FGDs) were used to collect in-depth qualitative information at the community level to capture:

- a. Knowledge and attitudes related to nutritious food production, consumption and utilization;
- b. Information on household decision-making dynamics with regard to the production, consumption, retention, purchase and sale of nutritious crops/ food; and

- c. Major barriers and motivating factors in the production and consumption of healthy foods.

In all surveyed kebeles, FGDs and production/consumption barriers analysis were conducted with MVHHs and Model Farmers. Furthermore, information collected in FGDs was used to triangulate data collected during KIIs. The evaluation team (ET) facilitated each FGD using a semi-structured interview questionnaire with probes as appropriate. In turn, ET encouraged participants to elaborate on points made throughout the course of each discussion to clarify points and achieve comprehensive responses for use in the analysis later.

The ET conducted KIIs with selected woreda agriculture and health offices as well as kebele-level AEWs, HEWs and kebele administrators/managers in order to obtain comprehensive information about program activities, information dissemination efforts and household production/ consumption behaviors. A short interview template listing the main topics and issues was developed to serve as a thematic guide for KIIs, with different tools developed for different types of KII participants. During data collection, all interviews were audio recorded and later transcribed. Final transcriptions were submitted alongside written notes drafted by the interviewer and/or note-taker.

For this study, the ET used an inductive qualitative data analysis approach and emergent framework to group the data. The audio recordings were transcribed and coded by thematic area to identify/categorize specific pieces of data with regard to various emergent themes. In addition, the analysis team (AT) used NVivo12 software to code FGDs and KIIs transcripts based upon a qualitative coding framework. Disaggregation of data on the basis of respondent (AEZ, production patterns, program beneficiary type) allowed for the analysis of key differences in observed knowledge, attitudes and practices between groups.

Preliminary analysis of the qualitative results occurred in the field, where the interviewers reviewed their findings on a daily basis. This was done to ensure the ongoing relevance of the tools and questioning techniques and allowed for each expert to explore preliminary outcomes in more depth. The information collected was then aggregated into expanded field notes and data were analyzed thematically with the relevant tabs, comparisons, patterns, associations, concepts and explanations.

III. Study Limitations

The ET attempted to identify and mitigate challenges during the inception and training/ pre-testing phases of the evaluation; however the aforementioned methodology is subject to minor limitations which may shape the findings presented in this report. The full package barrier analysis standard was not used and we only applied some components of barrier analysis, due to timing and logistics.

During the study's design, it was assumed that the ET would be able to easily obtain access to "non-doers" in the sampled regions and woredas. However, in practice, few "non-doers" were found within pre-selected communities and participant groups (MFs and MVHHs), making their inclusion in this study particularly challenging. During data collection, the ET was forced to forego many of the FGDs that were supposed to include "non-doers", due to field-level identification challenges". These challenges complicated data collection activities and necessitated increased communication amongst individual research teams, conducting FGDs and KIIs in different regions and zones.

Another limitation of the study was the short period lapse in the implementation of program activities, which made it difficult to observe behavior changes with regard to the new found production and consumption of nutrient-rich foods. Vegetable/fruit crops have yet to be harvested in many communities and there was a delay in the use of animal products within specific program woredas. In areas where implementation of program activities was delayed or is ongoing, the ET focused its efforts on monitoring existing practices and detecting early-stage signs of behavior changes.

Lastly, during data collection, the majority of those who were selected for participation in FGDs from MVHHs were women, and thus the opinion of men in these households was notably absent. Many of those represented in the MVHH category are female-headed households and are widows. Thus, the views obtained within these FGDs may be biased towards women's perspectives. In contrast, most of those selected in the Model Farmer FGDs were men, and women were heavily underrepresented within this category. To compensate for this lack of proportionality in gender representation, the ET did its best to include as many females as were available in FGDs with model farmers to obtain a diversity of perspectives.

IV. Findings

Many factors were found to shape the production, consumption, retention, purchase and sale practices of households included in this study. Within most households, extensive and intensive decisions of whether, what and how much to produce shaped by many factors including access to labor, critical production inputs, household consumption needs, as well as financial concerns such as access to credit. Physical, economic and seasonal access to inputs is considered particularly vital, as it shapes the ability of households to limit risk related to marketability of the produce, climate variability, disease, pests and soil types. Water and land scarcity are also considered as the two most pressing concerns of households.

1. Fruit

There are some commonalities in the factors affecting production of fruits in the three Agro-ecological zones of the two regions and significantly marked differences exhibited between the two regions. The factors facilitating or otherwise negatively affecting production, consumption and sale of fruits vary between the different categories of the study population within the two regions. The factors affecting the production of fruits could be categorized in three groups including:

- Environmental
- Socio-Economical/access to productive inputs and land
- Behavioral /knowledge

Fruit production started much earlier in SNNPR than in Amhara region; and therefore it is difficult to get insight in to factors affecting consumption and sale in Amhara region given the short period of time since planting of fruits and in most cases farmers didn't harvest any fruit as yet. As a result, the assessment of barriers and facilitators of fruit production, consumption and sale especially in some parts of Amhara are perceptual rather than assessment of practical or experiential factors.

1.1. Factors affecting household fruit production

1.1.1. Fruit Production facilitators

MVHHS in both Amhara and SNNPR have had access to fruit seedlings and have attended training programs provided by Growth through Nutrition. The knowledge about the benefits of the fruits (both financial and nutritional) is motivating factors for such groups to produce fruits. Most Model farmers in SNNPR and few in Amhara have had longer experience producing fruits where as for those MVHHS the experience is not long lived and in most cases coincides with the project lifespan.

Motivation from the agricultural and health extension workers is a common factor facilitating fruit production in both regions and across AEZs (except in the high lands of Amhara where fruit productions is either very low or none). The potential financial gain is another popular factor mentioned by all the study groups as main motivation. The nutritional benefit is an add-on to the financial benefit especially in Amhara region; however, this is not the case among the MVHHS in both Amhara and SNNPR who are not able to articulate the nutritional benefit of consuming fruits. Land availability is mentioned as a factor for farmers in SNNPR in that the perceived benefit makes farmers to have an open eye for any leftover space as an opportunity for fruit production. This is also mentioned among Amhara model farmers who have irrigable lands especially those in the low lands.

Summary of fruit production Facilitators by region:

SNNPR	Amhara
<ul style="list-style-type: none"> • Having access to fruit seedling • The opportunity to attend training on fruit production (All MVHH and few MF) • Knowledge about the benefit of fruit (economic and nutritional value) • Previous years of experience (MF and MVHH) • Motivation and technical support from agricultural extension workers • Land availability at the backyard 	<ul style="list-style-type: none"> • Having access to fruit seedling • The opportunity to attend training on fruit production. (All MVHH and few MF) • Knowledge about the benefit of fruit (economic and nutritional value) -, although limited especially nutritional value. • Previous experience (MF) • Motivation and technical support from agricultural extension workers • Land availability (MF)

1.1.2. Fruit Production barriers

The major fruit production barriers in Amhara in general and in the highlands in particular is environmental and physical, mainly type of soil. Black cotton soil expand and become sticky during rainy season and contract during the dry season causing deep cracks into the soil, constitutes the majority of the soil in the highlands of Amhara; this soil does not retain water up to the depth of the reach of fruit seedlings “according to Model Farmers in Amahra region”. This characteristic of the soil discourages the farmers from planting fruits. Shortage of water makes it hard for farmers to think of fruit production. Shortage of land is the other problem associated with fruit production in Amhara in general. In some of the midlands and low lands areas the type of soil has been mentioned as main barrier. Water shortage is another main barrier for fruit production in the mid and low lands of Amhara region. In addition a number of barriers have been mention by study participant including limited knowledge of fruit production and management, limited of knowledge about the nutritional benefits of fruit consumption, lack of knowledge how to improve soil water retention ability and lack of access to seedlings across all AEZs of Amhara region. Although, currently the knowledge and seedling access problem is alleviated by the project for women from MVHH, there is still problem exist among the model farmers. Low land farmers who have irrigable lands have less barriers to fruit production, compared to the highland and midland areas because they have access to irrigation water throughout the year.

Lack of access to land by the women from most vulnerable household, knowledge gap among the model farmers on fruit production and management, fluctuation of fruit price in the market and access to improved fruit seedlings for model farmers, are the major barriers to fruit production in SNNPR. Moreover, the perishability of fruits such as avocado is also considered to play a key role in the propensity of households to produce such products.

Across all agro-ecological zones in both regions (Amhara and SNNP) the production of fruit is not a priority for most households, while production of staple food crops for the household consumption and production of cash crops for sale were found to be the most dominant household production.

Summary of Fruit Production Barriers by region

SNNPR	Amhara
<ul style="list-style-type: none"> • Problem of land (for MVHHs) • Lack of access to improved seedlings from AEW (model farmers) • Prices fluctuation - Fluctuation of fruit prices in the market • Shortage of water during dry season. • Risk aversion - Priority given to staple food crops for the household consumption and production of cash crops for sale • Perishability of fruit like avocado is limited the production in large scale. 	<ul style="list-style-type: none"> • The type of the soil (black cotton soil which cracks when dry and poor water retention capacity) • Lack of knowledge about soil treatment to improve on water retention capacity • Limited knowledge about general fruit production and benefit fruit (model farmers). • Rain feed dependency - shortage of water in the high land areas except rainy season. • Land shortage (for women from most vulnerable household) • Risk aversion - Priority given to staple food crops for the household consumption and production of cash crops for sale • Limited market demand for fruit compares to staple food crops.

1.2. Factors affecting household fruit consumption vs sale

In Amhara region most of the farmers mentioned that fruit especially the sweet and tasty ones are very favored by children and are purchased as a treat (instead of candy); which is not the case for older members of the family. Families do not tend to purchase fruits for adult member of the family, if they have adult have consume fruits from own production. When fruits are purchased for children and very occasionally for women, it is not for their nutritional value but as reward or treat for children since they love them. In SNNPR avocado is one of the relishes eaten with Enset and this is found to be the major factor for the prioritization of fruit consumption over sale.

In addition, consumption and demand for additional food products such as fruits are not considered as pressing as demand for staples and cash crops, since fruit is not mainly considered for its nutritional value. Among many households in this study, intake of fruits is

far more common during the rainy season when they can consume from their own production. During the dry season (where there is a shortage of water), the availability of vegetables declines and fruit price increased consequently and fruit consumption at the household level decline dramatically due to household inability to purchase fruits a higher price.

1.2.1. Fruit Consumption facilitators

The presence of fruit tree in own farm is one of the main factors for fruit consumption in both Amhara and SNNPR. Although there are only few farmers who have fruit trees; study participants both in Amhara and SNNPR mentioned having own production as a major factor for fruit consumption.

Seasonal access to fruits, knowledge, attitude and fruit price are also other main determinant factors that the household consider (either implicit or explicitly) whether the production is for consumption and/or sell.

The availability of fruits on own farm and seasonal abundance in the market at lower price is a main facilitator. In general, availability, the good test and perceived medicinal value are the main facilitating factors for fruit consumption. For example, the men group, in SNNPR indicated that consumption of Guava helps to alleviate constipation. Some women in Amhara indicated the good of test banana is a facilitator to the purchase and consumption of bananas.

1.2.2. Fruit Consumption barriers

Sale of fruits is a source of income especially for MVHHs who have fruits in their back yard. In both Amhara and SNNPR, model farmers and MVHHs who have some fruits such as avocados, Mangos and Bananas prioritize these fruits primarily for market. The main reasons for this include prioritization of financial gain and consideration of fruits as luxury than real or nutritious food.

1.3 Factors affecting household decisions to purchase fruit

In general, financial capacity, prices of fruit in the market and availability of the preferred fruit in the market is the main factors for purchasing fruits. Knowledge about health benefits of fruits does not seem to be part of the factors to purchase fruits for consumption.

1.3.1. Fruit Purchase facilitators

In Amhara region presence of fruit in market, using fruit as gift and/or treat for children and in SNNPR health consideration of some fruit like guava for constipation are among the factors that facilitate the purchase of fruit. In addition, women informants in MVHHs group explained the nutritional benefits of fruits and they may buy them when they have money but this is a very rare situation, because usually they do not have surplus money to buy fruit. The long presence of fruits in SNNPR and the cultural change is one of the facilitator for the purchase of fruits in the region. People have started using Avocado as one of the main

relishes in their cuisine because of that fruits is not only consumed when do have own production but are also purchased for consumption.

1.3.2. Fruit Purchase barriers

Financial capacity is a common barrier for fruit purchase both for Amhara and SNNPR. However, in Amhara in addition to the limited purchasing capacity the attitude toward fruit consumption is another barrier fruits are considered as treats for children than proper nutritious food.

2. Vegetables

2.1. Factors affecting household vegetable production

2.1.1 Vegetable Production facilitators

MVHHs in both regions have had the chance to get training, agricultural inputs including seeds and a continued technical support from AEWs. The financial benefit they get from sale of vegetables is another key facilitator especially for those MVHHs in Amhara region. Household economy is another key factor in the production decision of vegetables in SNNPR. *“It is more economical to produce the vegetables such as cabbage which are one of the main relishes produced on own farm than to buy them in the market.”* According to FGD groups of both MVHHs and Model farmers in SNNPR. Vegetables such as garlic and red pepper are considered as cash crops and produces by most MVHHs who have access to production inputs including vegetable seeds

“In the previous years, farmers used to focus on cash crops such as species, pepper and onion. However, this trend is changing in the recent years (in the last four to five years) and farmers start to produce vegetable with the focus on consumption” (KII, Amhara, Takusa, Woreda Health Office).

“After we got the training from the Growth through Nutrition project, we start considering the healthiness of the food in our decision to produce and consume or purchase. In our previous practice, market price or the marketability of the crop is the first criteria followed by filling stomach and then healthiness comes at the last” (FGD, Amhara, Takusa).

Summary of vegetable production facilitators by region.

SNNPR	Amhara
<ul style="list-style-type: none"> • Access to knowledge and agricultural inputs • Saving money supposed to be used to purchase vegetables which are main relishes • Encouragement from AEW 	<ul style="list-style-type: none"> • Financial benefit from sale of vegetables such as cabbages, garlic and peppers • Access to agricultural inputs such as seeds and knowledge • Access to irrigable land (MF)

<ul style="list-style-type: none"> Financial benefit from sale of vegetables such as cabbages, garlic and peppers. 	<ul style="list-style-type: none"> Saving money supposed to be used to purchase vegetables which are main relishes
---	---

2.1.2 Vegetable Production barriers (Rank the barriers)

Land availability is the main barrier for both Amhara and SNNPR MVHHs and for those MFs in the highlands of Amhara. Water shortage is also another barrier in the highland, midland and lowland areas of Amhara region, but few lowland areas have limited access to irrigation. For Amhara MFs, access to vegetable seeds is additional barriers for those who do not benefit from the project. MVHHs in Amhara reported damage of vegetables especially Potato by hedgehogs is also another barrier. In addition production of vegetable at the back yard when combined with the small animal keeping is a problem for the vegetable production especially when there are not enough communal grazing lands.

Across all ecological zone in both regions vegetable is not considered as main source food for most households, rather production of staple food crops for the household consumption and production of cash crops for sale were prioritized by the household compared to vegetable production.

“The major factor for decision making is economic as well as risk aversion strategy.

Families tends to produce crops that are less perishable and can be sold relatively with higher price so that they can spend the money they get on necessary consumer goods and cover other household expenses” (FGD Expanded Notes, Amhara, Takusa, MVHH).

Summary of the main barriers of vegetable production in Amhara and SNNPR are a follows in order of importance

SNNPR	Amhara
<ul style="list-style-type: none"> Shortage of land availability (especially for MVHHs) Perishability of vegetables and inability to produce at scale Less access to improved seeds Difficulty with small animals (sheep, goats and chicken) damaging vegetable farms Shortage of water during dry season Priority given to other staple and cash crops 	<ul style="list-style-type: none"> Land shortage to produce at scale Lack of reliable and readily available seeds Lack of pesticides and means to prevent vegetables from rodents (hedgehogs) Shortage of water during dry season Perish-ability of excess produces of vegetables and seasonal variation in price. Priority given to other staple and cash crops such as pepper and teff.

2.2. Factors affecting household vegetable consumption vs sale

The need for additional income is a common driving force for sale of vegetables in households across both study areas. However, the trend of sale of vegetables instead of family consumption is much more common in Amhara than in SNNPR. In SNNPR MFs

prioritized family consumption as compare to sale during the discussion and this could be explained by their improved productivity and relaxed cash situation.

2.2.1. Vegetable Consumption facilitators

The main facilitating factors for vegetable consumption in SNNP includes ownership on own farm, type of staple food consumed (Enset based food is usually combined with vegetables) and availability of alternative cash crops for sale.

In Amhara region vegetable production on own farm, vegetable consumption during fasting seasons, and availability of alternative cash crops found to be a facilitating factors for vegetable consumption at the household level. In addition, knowledge provided on the nutritional value of vegetable and skill to prepare vegetable based food and preference of vegetable by some family members is found to be another facilitating factor.

Both in Amhara and SNNPR the decision to consume vegetables primarily shaped by the taste preferences of family members, the knowledge of mothers to prepare vegetable base food and diet diversification, the magnitude of household crop production, and the financial needs of the family which warrant the sale of lucrative crops. In certain cases, children request to eat certain vegetables, so mothers will take these preferences into account when they are preparing meals. Furthermore, many of the women from MVHHs have begun taking into account the healthiness of vegetable foods when preparing meal.

“Vegetables help children develop healthy brains. They become strong and healthy when they consume different kinds of vegetables. Vegetable and animal products are good for pregnant women as well, and make the fetus healthy and strong” (FGD, Amhara, Enemaye, MVHH).

2.2.2. Vegetable Consumption barriers

Both in Amhara and SNNP the major barriers for vegetable consumption includes; insufficient availability of vegetable in the market, priority given to sell than consumption especially when the prices of vegetable is high in the local market and also high cost of vegetable to buy from the market during dry season. In addition in Amhara lack of dietary diversification was one of the main barriers (most families mainly consume pulses and cereals) followed by, lack of production capacity, cash priority over nutritional security, basic stable food and financial insecurity are among the major barrier to consume vegetable.

2.3. Factors affecting household decisions to purchase vegetables

2.3.1. Vegetable Purchase facilitators

The facilitators for vegetable purchase in both regions and across all groups are the same; however, it was revealed that purchase of vegetables in Amhara region is not a priority for many of the household since the priority is given for the purchase of coffee beans and alcohol. The following are the main facilitators for purchase of vegetables in both regions and in all

agro-ecological zones: knowledge about benefits of vegetables especially among the MVHs and model farmers who do not have access to training courses, better finances due to sale of cash crops, availability of vegetables in the market and consumption experience (SNNP) and taste Preference in some of the vegetables.

2.3.2. Vegetable purchase barriers

The main barriers to purchase of vegetables are financial capacity, especially among MVHs in SNNPR and in Amhara, competing priorities, availability of vegetable in the market with reasonable price, habit in the consumption of food which does not involve vegetables, food taboo especially among pregnant mother, mockery from neighbors or older relatives (perception that buying vegetables is wastage of money) are among the barriers to purchase vegetable.

In SNNPR the food pattern and diversity of diet is consists of vegetables such as cabbage; however financial constraint is the main barrier that limits the ability of families, especially MVHs, to purchase vegetable. One of the women in the MVHs group mentioned that the cash shortage even forces them to divert from their normal choice or relishes by saying:

“we have a serious cash shortage in my family. My husband works as a daily laborer and he is not healthy and strong due to which we don’t usually have enough cash. Due to this we prefer to buy and eat bread or enjera rather than Enset based foods which is the main staple in the region. You can eat enjera and bread with pepper or tea but you need relishes such as vegetables, avocado or cheese to eat our traditional food (Enset).”

3. Animal source foods (ASF)

3.1. Factors affecting household ASF production

Animals are more than source of food for the household; they are assets, signs of affluence and insurance for financial security in many rural families. According to discussion with MFs in Amhara, the ownership of animal has decreased overtime because of decrease in communal grazing land size in the rural areas. As such farmers in Amhara region forced to keep small number of animal heard since keeping large number of animals is a burden rather than an asset. Similarly, based on the discussion with model farmers in SNNPR, the trend of minimizing the number of animal at the household level is in the rise. Although the trend on the number of animal rearing at the household level is decreasing most male MFs interviewed in SNNP have a greater number of cattle and small animals (sheep, goat and chicken) than those in Amhara.

Regarding the production of ASF, SNNPR have more opportunity to benefit from dairy product than Amhara. Enset is one of the main staple food in SNNPR is eaten with dairy product such as cheese, butter and eggs where as in Amhara this is not the case. Amhara farmers may not benefit from animal husbandry apart from keeping them for sale it is a cultural taboo to sell milk. The shrinking communal grazing areas are another factor which discourages families from keeping cattle and focus on small animals when there is a financial capacity.

3.1.1 ASF Production facilitators:

In both SNNPR and Amhara the facilitating factors for animal production includes: animals are considered as main assets for the household, animals are source of incomes (sell of milk in SNNP and sell of butter in Amhara), availability of animal feed during the rainy season and after crop harvest, animals are also sources of healthy food, which have nutritional benefit for children and adult family members. In addition, provision of technical support, motivation and knowledge on rearing small animal provided by animal production experts/AGEWs and provision small animal for women from most vulnerable household is also facilitating factors for ASF production.

Summary of ASF production facilitators.

SNNPR	Amhara
<ul style="list-style-type: none"> • Animal are assets for rural community • Availability of animal keeping space and animal feed during rainy season and after crop harvest (crop residue) • Good sell price of animals and animal products in the current market or high demand for animal products • Animals are source of food for the household specially for children • Knowledge gain from AGEWs on modern animal rearing and feeding (cut and carry method) where there is shortage open grazing areas • Provision of small animal for women from most vulnerable household. 	<ul style="list-style-type: none"> • Animal are assets for rural community • Availability limited animal keeping space around the garden and animal feed during rainy season and after crop harvest (crop residue) • Good sell price of animals and animal products in the current market or high demand for animal products • Animals are source of food for the household specially for children • Knowledge gain from AGEWs on modern animal rearing and feeding (cut and carry method) where there is shortage open grazing areas • Provision of small animal for women from most vulnerable household.

3.1.2 ASF Production barriers

For MVHHs the main barrier for production or rearing of small animals is lack of financial capacity to acquire across both region. For the model male farmer’s in Amhara, the main barriers for keeping large stock of animals are shortage of communal grazing land and lack of knowledge about modern rearing methods such as cut and carry method

In addition, chicken and sheep disease epidemics coupled with expensive veterinary services and medication for such diseases was described as a barrier by MVHHs in Amhara. It was

reported that some of the women interviewed have already lost their chicken and sheep due to these problems. It was also reported that lack of improved chicken breed for poultry production is another barrier. Lack of finances to keep chicken in enclosed places (fencing) which could prevent disease, hunting by wild animals and being source of conflict with neighbors was repeatedly mentioned by MVHHs in both regions. It was also mentioned that the project didn't keep its promise of providing the improved chicken for poultry production, while women prepared the cages by investing their scarce resource.

In SNNPR MFs and some women rear goats during the winter, however they are not important source of food since they don't use their milk (people are not used to milking goats) and slaughtering goats for their meat is not very common because financial benefit from their sale is given priority.

Summary of ASF production barriers:

SNNPR	Amhara
<ul style="list-style-type: none"> • Lack of finance to buy animals for rearing for these who do not have any animal • Shortage of communal grazing areas for high number animal rearing, • Lack of knowledge on modern animal rearing and feeding system (model farmers). • Animal disease and unavailability and high price of veterinary medicines in the local market and stock out in public clinics. • Wild animal attack of small animal like chicken. 	<ul style="list-style-type: none"> • Lack of finance to buy animals for rearing for these who do not have any animal • Shortage of communal grazing areas for high number animal rearing, • Lack of knowledge on modern animal rearing and feeding system (model farmers). • Animal disease and unavailability and high price of veterinary medicines in the local market and stock out in public clinics. • Wild animal attack of small animal like chicken. • Lack of improved chicken

3.2. Factors affecting household ASF consumption vs sale.

Sale of small animals for meat is very common and is considered a very reliable source of income at critical times of cash need. Milk is not for market especially in Amhara that cattle are there for family supply of milk. In SNNPR dairy products such as cheese and ghee are sold. Goats and sheep are considered as household assets rather than source of food unless they are slaughtered during holidays. Chicken in both Amhara and SNNPR are important source of ASF since eggs are priorities for children. MVHHs in Amhara however indicated that their financial need is usually high and they prioritize eggs for sale.

3.2.1. ASF Consumption facilitators

The tradition of animal source food consumption is better in the lowland areas because they produced relatively large number of animals which can be adequate both for consumption and sell. In the mid and highland of Amhara the tradition of not selling animal products like

milk is facilitators for consumption rather than selling. In the low and midland areas of SNNP and Amhara the availability of the eggs in the household facilities the high consumption of eggs households tends to rear chicken in a reasonable number and they produce reasonable number of eggs which increase the availability of eggs in the house.

The new knowledge they acquire from the training courses is a motivator to consume eggs and even few women buy fish from the market for their children. For some, family especially the model farmers, the financial and asset security gave them the confidence to consume animal source food.

3.2.2. ASF Consumption barriers

Both in Amhara and SNNP animal source food is not regularly consumed by most households unless there is religious holidays and other events such as weeding, it is rather for sell to earn income, the notion is that animals are sustained sources of financial security makes it difficult for families to slaughter sheep or chicken as source of food. For most MVHHs the financial insecurity forces them to prioritize sale of eggs over family consumption.

Traditional food habit is also another barrier for consumption of animal source food, the goats' breeds in SNNPR are not used for milking and or people do not know about use of goat milk and the same is true for Amhara region and they do not use sheep milk for household consumption. In addition, limited knowledge about nutritional value of animal source food is also another barrier hinders the family from using the animal source food and animal source foods are perceived as luxury food prepared for special events or fest.

3.3. Factors affecting household decisions to purchase ASFs

3.3.1. ASF Purchase facilitators

In both regions and in all AEZs the good test and palatability of animal source food is a facilitating factor to buy ASF. The tradition that considers animal source food as especial food for special occasions during holidays and important social events is a facilitator to purchase animal source food if they do not have own products. In addition, family income and availability of the ASF in the local areas is also the facilitator to purchase animal sources food.

3.3.2. ASF Purchase barriers

Across all AEZs in both regions the notion of ASF is mainly purchased and used for special occasion, low financial capacity and high cost of ASF in the local areas is the major barriers for most household to purchase animal source food for household consumption. In addition, the limited knowledge about the nutritional value of animal source food also another barrier for the purchase ASF, however, this barrier is addressed for MVHH who have been attended different training on health and nutritional benefit of ASF, however, most of the model farmers who did not get the chance to attend the training have shown the existence of knowledge gap.

V. Effects of sale of production of healthy foods on household diet and food security.

Sale of ASF, vegetables and fruits are an important source of financial security in SNNPR but not a main source of income. In Amhara exchange of crops is a major strategy to balance financial and food security in the household but further investigation needs to be conducted to establish whether the exchange of staple crops affects the nutrition security of the household. For example, families prefer to keep maize and sorghum for family consumption because these crops are relatively cheaper compared to teff which attracts more cash. The family then mixes maize, sorghum with the aim to increase the volume stock for annual consumption; this mixing of cereal may contribute to the diversity food crops consumed by the families.

Throughout the study, it is observed that there is higher probability of achieving dietary diversity and hence nutritional security with production of health foods. This indicates that it is the production that has higher importance compared to the sale of healthy foods to affect nutritional/dietary security.

V.1. Importance of achieving quality diet in household decision-making

Preferences and preparation of food is highly influenced by culture, knowledge and education in the family. Knowledge and exposure to new approach to valuation of food and food preparation technique is significantly important in order to achieve nutrition security and diet diversification. Family priorities are mainly influenced by perception and knowledge –it is clear that food diversification and nutrition security is not the priority of families not only because of poverty but also knowledge and perception.

Food and financial security are the main factors in the household decision making process for production, sale and consumption of agricultural produces nutrition security is unintentionally (because of lack of knowledge) or intentionally (because of the household economy) the least priority. As discussed in different sections in the report, so far households try to ensure there is enough supply of food for the family throughout the year and in doing so the cheapest crop is kept for the family consumption because priority is given to the earning of income.

It is important to note that, when there is production of healthy food products such as fruits, vegetables and ASF, the family usually gets the opportunity to consume what is left from sell; however when it comes to staples there is generally a tendency of going for the cheaper option of crops (this in general can be seen as achieving food security through cheaper option or replacement of expensive staples for the cheaper ones in order to achieve safe and balanced food economy).

In general it is more of the production pattern that affects the nutrition security of the family diet than the decision to sale or consume. Although a change in food pattern may be achieved in the long run driven by production pattern and perception change towards nutrition security; a culture of purchase of healthy food items to achieve nutrition security is a long way to go especially in Amhara region and among both MVHHs and MF.

XX

VI. General Conclusion and Recommendation

VI.1. Factors Affecting Production of Nutrient-Rich Foods:

Although more than 75 percent of model farmers and women from MVHHs in the study who receive training from the Growth through Nutrition project report widespread increased knowledge of health benefits resulting from the consumption of nutrient-rich foods, the production of fruit, vegetable and animal source food is not a priority for most households specially in the Highland woredas of Amhara region.

Production of staple food crops for the household consumption and production of cash crops for sale were found to dominate over other forms of household production. Most farmers (particularly those within MVHHs), weigh household consumption and retention of staple crops heavily in their decision regarding the amount and types of products to cultivate, given available resources. Almost all FGD participants (both Model Farmers and MVHHs) report that cultivation of cash crops for sale in the market is given priority as a means of increasing a household's income and therefore its financial assets.

“The major factor for decision making is economic. Families produce cash crops that can be sold relatively with higher price so that they can spend the money they get on necessary consumer goods and cover other household expenses” (FGD Expanded Notes, Amhara, Takusa, MVHH).

The main focus of households is to make sure the produced crops are adequate for the whole family throughout the year, and that the household has extra financial resources to purchase excess items where yields are insufficient. Only when the basic consumption needs of the household are met or when extra land is available in excess of requirements for staples and cash crops, do farmers consider production of other healthy food items¹⁰ (fruits, vegetables and small animal source products) which can be consumed in the household or sold in the marketplace.

¹⁰ Nutrient-rich food items were perceived to be luxuries by many of the farmers sampled in the study; demand for fruits, vegetables and animal source products was found to more elastic than for other items.

Production of crops outside of the staple, relish, and cash-crop is generally considered to denote a heavy element of risk in terms of production factors and success at market. Throughout the course of data collection, numerous FGD participants noted that insect and animal damage, disease, and water shortage have historically impacted the quality and viability of vegetable.

“We have lack of pesticides and medicine. Most of our production is wasted because of lack of medicine. For example, tomato production is wasted because of lack of medicine. We have only one type of pesticide but there are 4 or 5 types. If we could get those, tomato production would improve. We also don’t have the knowledge and trend to go and purchase improved seeds. It also requires financial capability” (FGD, SNNPR, Cheha, MF).

“We tried to grow potato after getting the seed from the project but wild rats ate it all, and it’s beyond our capacity to get rid of them” (FGD, Amhara, BasoLiben, MVHH).

In addition, consumption of and demand for alternate products like fruits, other vegetables and small animals may be more elastic than demand for staples and cash crops, which are more stable. While certain vegetables may be marketed at a higher price than some other products, the ability of farmers to sell these products may depend on the desire and financial capacity of families in the nearby area to purchase these foods. There is also the risk of oversupply in the local market, as was the case for avocado producers in Chena woreda.

Moreover, the perceived perish-ability of fruits and vegetables is also considered to play a key role in the propensity of households to produce such products *masse*. In SNNPR Model Farmers said:

When perishable goods such as vegetables are produced, they are eaten or sold quickly for immediate consumption. Since these items must be dealt with quickly after harvest, where produced they are done so in smaller quantities than staples like Teff or Enset.

The financial status of households across all study groups also serves as perhaps one of the biggest factors in household production decision-making. Physical access to vaccinations for animals, improved seed varieties, pesticides, and animal feed is key to ensure the viability of agricultural yields. Moreover, access to credits is also fundamental to support the ongoing procurement of production inputs by cash-poor households. One of the participants of MVHs in Amhara region said

“Older people or people who do not have someone to help them on the farm rent their lands for equal shares; but they prefer not to rent their land for us since we are poor. When you are poor you will not be able to buy fertilizers, spend more time on the farm and improve your

productivity; they believe they wouldn't get enough if they rent their land to us; this makes our situation even worse even to be able to rent land to produce vegetables or fruits."

Other attitudes that hampered the cultivation of healthy foods included in some cases, social beliefs about the role of women as caregivers discouraged activities related to food production and marketing, reluctance to accept new things, and in some households, small animal rearing was considered to be an inconvenience for households without older children, who lacked sufficient labor to provide ongoing care, such as for sheep that require daily grazing.

"Some of the community - especially the older generation - discourages women from partaking in trainings to produce, consume and sell vegetables. They would rather prefer the women to stay at home and raise the children" (FGD, Amhara, Takusa, MVHH Expanded Notes).

However, there has been some project success in encouraging the production of healthy foods. Some fruits and vegetables were produced by households in the surveyed regions including green collard, onions, garlic and tomatoes (in Amhara), and cabbage, avocado, and mango (in SNNPR). MVHHs who have access to production inputs including vegetable and fruit seeds began cultivating these crops at backyard. In turn, increased communal familiarity with these items has led some to forego production of cash crops in favor of new species of fruits and vegetables in Amhara.

"In the previous years, farmers used to focus on cash crops such as species, pepper and onion. However, this trend is changing in the recent years (in the last four to five years) and farmers start to produce vegetable and fruits with the focus on consumption" (KII, Amhara, Takusa, Woreda Health Office).

"After we got the training from the Growth through Nutrition project, we start considering the healthiness of the food in our decision to produce and consume or purchase. In our previous practice, market price or the marketability of the crop is the first criteria followed by filling stomach and then healthiness comes at the last" (FGD, Amhara, Takusa).

The main benefits associated with increased production at the household level are decreased need for expenditures on nutrient-rich foods at the market (particularly in SNNP region where fruit and vegetable consumption is not new), the provision of additional income through the sale of crops and animal products, the improved financial status of some women from MVHHs who are in charge of small-scale fruit and vegetable cultivation, and increased access to healthy foods that were previously unaffordable for many low income families. As one woman stated, "it is easy to feed children eggs when there is egg production at home, otherwise it is difficult to purchase" (FGD, Amhara, Takusa, MVHH).

Households' propensity to produce nutrient rich crops is heavily influenced by the following factors such as soil type not suitable to produce vegetable and shortage of water in the dry season to irrigate the crops are the main factors in the highland of Amhara region. Likewise behavioral and access to agricultural input are factors in the low lands of Amhara and in SNNPR in general. In both region and all AEZ the primary factor affecting production for MVHHS is socio economic and access to land. MVHHS do not have enough land to cultivate and their poverty adds on to their inability to access land since people do not trust them to be productive to rent their lands.

Decision to rear small animals and cattle in both regions and across all AEZs is affected primarily by access to grazing land, knowledge about animal health, financial capacity to purchase and keep these animals and the availability of labor to help in the household affects the production.

VI. 2. Factors Affecting Consumption of Healthy Foods through Retention or purchase of Nutrient-Rich Foods

Research has shown that Ethiopian diets are less diverse than others throughout Africa, particularly in rural areas where pervasive poverty, seasonal weather shocks and fluctuations in market access continue to impact the production, consumption and retention of nutrient-rich foods.¹¹ Among many households in this study, intake of vegetables and fruits is far more common during the rainy season when they can consume their own household production. During the dry season when the availability of vegetables dwindles, so do consumption-related expectations of many families, who cannot afford to purchase nutrient-rich healthy items marketed at high prices.

“During fasting seasons, we purchase green vegetables and it is very special to us, like meat, it is a once in a blue moon delicacy in our household” (FGD, Amhara, Enemaye, MF).

In turn, regular consumption of animal source products including meat and milk was found to be uncommon among both model farmers and MVHHS in most of the sampled woredas. While milk is often consumed within households where it is produced, it is not commercially available for purchase in Amhara as the majority of excess household milk production is converted into butter—which is less perishable and has a higher market value.¹² While model farmers from Gumer woreda mentioned that they sometimes buy meat, cheese, and butter from the market, consumption of meat products is generally irregular, since

¹¹ “Diet Patterns in Rural Ethiopia: Peering Within Households and Beyond Calories to Individuals and Nutrients That Matter” (Feed the Future, the U.S. Government’s Global Hunger and Food Security Initiative).

¹² In some communities in Amhara, men (women???) use butter on their hair, thus it is not directly consumed.

slaughtering cattle, oxen, chicken and goats is heavily associated with religious holidays or significant cultural events like weddings and funerals.

Respondents in both Amhara and SNNPR agree that decisions to consume nutrient-rich foods through retention of household production are foremost managed by women, since mothers are charged with cooking and food preparation in the household. The decision to retain household produce is thus shaped by the taste preferences of family members, the knowledge base of mothers with regard to food preparation and diet diversification, the magnitude of household crop production, and the financial needs of the family which warrant the sale of lucrative crops. In certain cases, children will request to eat certain fruits and vegetables, so mothers will take these preferences into account when they are organizing meals. Furthermore, many of the women from MVHHs have begun taking the healthiness of foods into account when choosing to retain crops produced using improved seed varieties provided by the Growth through Nutrition program. When discussing the impact of fruit and vegetable consumption on maternal and child health, FGD respondents most frequently cite observed growth and improved strength among themselves and their children.

“When children consume [fruit] they become energetic and happy. If one doesn’t have money, he would borrow it from me to purchase [fruit] for his children. It is beneficial for their growth and health” (FGD, SNNPR, Gumer, MF).

“Vegetables help children develop healthy brains. They become strong and healthy when they consume different kinds of vegetables. Vegetable and animal products are good for pregnant women as well, and make the fetus healthy and strong” (FGD, Amhara, Enemaye, MVHH).

Unlike production, decisions to consume through market purchases are less straightforward and are often negotiated by multiple members of the household. While women frequently decide upon the types of vegetables, staples and fruit purchased regularly during the harvest season, oftentimes they must consult their husbands in order to purchase higher cost items.

“Some men are still stuck in their old ways and do not appreciate having to spend extra money to buy the vegetables from the market, even if they briefly enjoy the vegetables their wives produce” (FGD, Amhara, Takusa, MVHH).

Ultimately decisions regarding what to buy and how much are consistently shaped by a number of factors including attitudes toward nutritious food consumption (reflected in willingness to pay), knowledge levels related to preparation of healthy foods, familiarity with and market access to seasonal produce, household financial constraints, preferences for other goods/consumables such as coffee and cooking oil, favorability of certain food types by members of the household, the magnitude of healthy food production at the household level, and consumption of complementary and supplementary goods.

In some cases, long travel time to-and-from markets hinder households from purchasing market items frequently. Even when travel to the markets is feasible, many items may not be available for market consumption. Furthermore, since vegetables perish easily, it is impossible to store them for long periods of time—making consumption of many nutrient-rich foods heavily infeasible once products are out of season. Overall, households report a low willingness to pay for ongoing consumption of healthy foods like vegetables and fruits when access to such products is limited and prices are inflated.

Within many communities, buying meat and animal source products was considered extravagant and cavalier, while the ongoing purchase and consumption of drinks including alcohol, tea and coffee was believed to be justified—even amongst those in the poorest income demographic. Moreover, many communities considered the purchase of high-cost fruits and vegetables at market to be wasteful and a poor utilization of scarce household financial resources which were needed to satisfy other more pressing household consumption needs.

“The people of the area would be surprised and mock if they see a woman purchasing cabbage and green leafed vegetables with the money she got selling crops. She would be considered extravagant and silly. She is expected to buy other consumer goods for her household rather than green leafed vegetables” (FGD, Amhara, Takusa, MVHH).

Despite these challenges, the expansion of information-related activities is expected to enhance the perceived benefits of nutritious food consumption by increasing knowledge about diet diversity, and improving household familiarity with and fondness for fruits, vegetables and animal products. When women possess heightened knowledge about the preparation of nutrient-rich products, they are better able to incorporate healthy ingredients into household meals. In one case, women who have been made aware of the health benefits of vegetables were able to reduce the financial costs of ongoing consumption through creative cost sharing measures:

“MVHH purchase vegetables like cabbage for household consumption since they are aware of the health benefits. Women buy vegetables from wholesalers then divide it among their neighbors/friends since the price gets cheaper when bought from wholesalers than retailers” (FGD, Amhara, Enemaye, Expanded Notes).

Ongoing support from AEWs and HEWs is particularly beneficial to incentivize and reinforce sustainable behavior changes among families who have chosen to engage in new nutrition-sensitive cultivation and consumption practices. Since these individuals are respected highly in the communities where they work, their ongoing involvement as mentors and

demonstration leaders is considered a relevant factor in positively shaping community attitudes towards diet diversity campaigns.

VI.3. Factors Affecting the Sell of Household Production and Benefits

Decisions to sell household produce at market are negotiated within households. While women are the ones charged with selling produce and animal products at market, they regularly consult their husbands in deciding which products should be sold or retained. However, those who come from male headed households reported that wives have no decision-making power with regard to production or sale of crops at market. This is particularly true with regard to the sale of products with a high market value including animals, animal products and cash crops, since decisions to retain or sell items may significantly impact household income and therefore shaping its annual consumption capacity.

Since the primary concern of households is providing for their family's annual consumption needs, money earned from the sale of cash crops is first devoted to ensuring a sufficient supply of food for the entire year. In cases where households produce a surplus of staples, vegetables or fruits, these items will be sold at the market following the harvest in order to pay off loans or taxes, finance production inputs like fertilizer or pesticide, and purchase other household consumables like cooking oil, coffee, or tea.

"We have our own needs so we would rather sell the milk and buy coffee and sugar than to have milk and not be able to drink coffee...We drink areke (local alcoholic drink) on market days, but we could have used the money to buy healthy foods if we had the knowledge...We also buy coffee which is more expensive than vegetables (up to 115 birr per kilo gram) thus it's more related to the knowledge gap" (FGD, Amhara, Enemaye, MF).

Many of the challenges related to the sale of household production stem from varying levels of market demand for healthy food items which are generally deemed unnecessary for day-to-day household consumption. While cash crops maintain a high price, households with surpluses of certain fruits and vegetables may not be able to market all of their products when supply exceeds demand, and thus the unrealized income will expire along with the excess produce. In certain cases, where market demand for healthy products has lagged behind production-related behavior change, the oversupply of low-priced nutrient-rich foods has resulted in diminished incentives for healthy food production and widespread waste of perishable goods.

"We all provide to one market. If I produce large amount [of vegetables] what would I do with it? Because we don't have market access. The price goes down and it will be a loss" (FGD, SNNPR, Cheha, MF).

The sale of household production is facilitated by enhanced access to market linkages, which improves the perceived self-efficacy of farmers to market their products widely while reducing financial and nutritional waste¹³. However, overall there is a not large incentive to produce nutrient rich crops to sell at market.

Decisions to sell household production were foremost influenced by the types of crops grown at the household level (i.e. cash crops for sale, and staples for consumption), the perish ability of household yields, the demand and prices of the crop in the market, and the magnitude of production surpluses. The sale of nutrient-rich foods with high selling prices help families to cover critical expenses including loan repayment for fertilizer (and other production inputs), children education related costs, and vaccination costs. Households who sell healthy foods are able to achieve an improved household income and purchase a diverse array of highly-desired consumables including coffee, tea, cooking oil, and pepper, among other things.

VI.4. Household preferences related to achieving a quality diet

Local knowledge played heavily into attitudes of many community members with regard to the production, consumption and purchase of nutrient-rich foods. Despite some changes due to the education efforts around the importance of diet diversity and the distribution of healthy food inputs, non-staple items including fruits, vegetables, and animal products are often still considered a luxury among communities—warranting less interest in their widespread cultivation and purchase. While MVHHs consisting mainly of women in the study reported seeing the benefit of their families consuming these foods, women often had less decision-making around what foods the family would produce. When households had access to such items by means of household production, they were found to enjoy the taste, however most failed to value these products highly when facing market tradeoffs and risks. In most cases, optimizing caloric intake to quell hunger year-round was emphasized first in a household's decision-making process. Additional income from sale of crops is directed toward purchasing other household products (i.e. coffee, alcohol, red pepper, etc.), paying back loans, and maximizing savings. Sale of staple and cash crops was seen as much more stable and reliable than that of fruit and vegetables. Most of the FGD and KII respondents ranked the healthiness of foods as very low in their propensity to produce, consume and purchase these products at market, although there was some indication that this was slowly beginning to change for the better in some areas.

¹³ Incurred as a result of the perishability of many nutrient-dense fruits and vegetables produced by households

VII. Conclusions

Many factors collectively influence household decision-making related to the production, consumption, retention, sale and purchase of healthy foods. Throughout the woredas sampled in Amhara and SNNP regions, there was heavy overlap with regard to the drivers and barriers of specific behaviors as they pertain to household nutrition and diet diversity.

While women from many MVHs have begun to feed their children fruits and vegetables since they believe that these products will help their children grow strong, their knowledge with regard to the safe preparation of these foods seems to have substantially increased as a result of the education provided to them by HEWs and AEWs. In turn, some model farmers have got a chance to attend training reported increased familiarity with new vegetable and fruit crop varieties, despite ongoing reluctance to adopt these new items into their daily consumption patterns (particularly in Amhara where a preference for consumption of Enjera and shiro remains widespread).

Local knowledge played heavily into attitudes of many community members with regard to the production, consumption and purchase of nutrient-rich foods. Non-staple items including fruits, vegetables, and animal products were often considered a luxury among communities—warranting less interest in their widespread cultivation and purchase. When households had access to such items by means of household production, they were found to enjoy the taste of many of fruits and vegetables.

Overall, many of those interviewed expressed fondness for the training they had received from HEWs and AEWs as part of the Growth through Nutrition program. Many reported that AEWs were particularly well respected, and that communities were oftentimes willing to listen to the advice afforded to them by these individuals, given their ongoing support and reputable position in society. Recipients of programmatic support for the production of nutrient-rich foods (women from MVH), were also quite pleased with the program's provision of both improved varieties of seeds and small animals for rearing at the household level.

However, many of the program beneficiaries perceived land shortage and pervasive water insecurity as barriers to household fruit, vegetable and animal production; this is especially the case for small animal keeping which is considered as potential for conflict with neighbors—which resulted in the inefficient use of program resources. MVHs involved in vegetable production wanted to rent land from older and labor poor farmers; however their poverty is perceived as weakness (since they can't afford to buy fertilizers and spend more time on farm) and cause for low productivity which prohibited them from overcoming their land shortage through renting. Financial challenges were found to derive from unfavorable financial conditions for the procurement of production inputs (i.e. fertilizer and pesticide for

crops, and drugs for animals), lack of access to high-quality medicines or drugs for livestock, and in the visited midland and highland woredas of Amhara regions there was delays in the provision of chicken promised to them by the program.

In addition, women were better able to adopt the growing practices afforded to them by health and agriculture trainings and demonstrations, when they received high levels of spousal support for the cultivation of nutrient-rich products at home. While most married women from MVHHs surveyed reported a high level of spousal support for program-related production activities, multiple respondents suggested that their husbands' preferences for cultivating other crops reduced their capacity to produce fruits and vegetables at home; this tendency of farmers to produce crops than vegetables and fruits is more common in Amhara (where fruit and vegetable production is perceived less beneficial) than in SNNPR.

An array of factors were found to shape the production, consumption, retention, purchase and sale practices of households included in this study. Production of staples (Enset, red teff, millet, barley, maize, etc.) for consumption, and cash crops (red pepper, coffee, chat, white teff, etc.) for sale at market were found to dominate all other forms of household production among Model Farmers in both Amhara and SNNPR. Despite the influence of these products, some fruits and vegetables were produced by households in the surveyed regions including green collard, onions, garlic and tomatoes Avocados, Bananas and guavas (in Amhara) and cabbage, avocado, bananas, and mangoes (in SNNPR).

Further work is needed to continue to teach households about the importance of consuming healthy foods, combat misinformation and increase familiarity with less common foods, create a taste for health foods and expand the sessions on the cooking methods in order to increase the demand for these foods. In terms of production, additional efforts to increase familiarity, access to inputs, decrease risks and store and preserve perishable crops as well as increased support from DAs will help to drive greater production of healthy foods at the household level.

VII. Recommendations

At present, the widespread misalignment of knowledge about and attitudes towards healthy foods has resulted in a low willingness to pay for such items, despite many communities' familiarity with their importance for maternal and child health. Since social norms governing desirable consumption and purchasing patterns continue to play a role in the high valuation of and inelastic demand for coffee, high-cost celebrations, cooking oil, and other consumables, more must be done to tailor financial, social and medical incentives in the BCC packaging to increase the overall desire for healthy foods.

As it stands, early adopters of nutrition-sensitive production strategies are exposed to heightened environmental risks including disease, unfavorable soil conditions, and damage from insects and pests. This impacts their perceived self-efficacy to produce nutrient-rich crops. Since only a few families have produced these healthy food items within many of the sampled communities, insect and pest-related damage may be disproportionately felt by early adopters including those living in MVHHs. Incentivizing and facilitation of production of fruits and vegetables amongst selected early adapters may be an important way to prevent aforementioned crop vulnerabilities against any one group. In turn, training on protection of crops against pests, and livestock against disease should be strengthened in the existing AEW package; improving access to fair and equitable access to animal health through ways such as improvement of the supply chain and partnership and price regulation of animal health service is an area that the project needs to investigate on. Beneficiaries of the program should receive subsidized access to fertilizer and pesticides, as well as help from AEWs accessing vaccinations and quality drugs for treatment of small livestock to improve the impact of the existing interventions.

Lastly, efforts deployed by the Agriculture Office in SNNPR to establish market linkages and decrease the household costs associated with selling production surpluses should be expanded and enhanced. Furthermore, establishing small-scale mini-markets in villages may be advantageous so that smallholder farmers have a venue in which to market their products and access vegetables, fruits and small animal products locally. Where possible, increase the target in the production of certain crops should be supplemented with strong campaigns to improve community perceptions about the desirability of different foods and their ease of consumption. This will ensure that internal markets for healthy foods are created and maintained, and that market access burdens are lessened, as investment in nutrient-rich crop production increases

Specific recommendations include the following:

- Resolve the misalignment of knowledge about and attitudes toward healthy food production and consumption by expanding nutrition-sensitive training within communities (using training-of-trainers and informational diffusion techniques).
- Identify community beliefs about nutrition that may inhibit the impact of nutritional interventions and develop a localized strategy for increasing knowledge about misconceptions.
- Find a means to address land shortages of landless women from most vulnerable household which hinder household production of healthy food through supporting landless women to access land from those who are labor poor and rent their land and introduction of intensive farming techniques.

- Consider introduction of more intervention like water-harvesting, digging small well, encouraging multiple use of same water to address the shortage of water specifically for MVHH.
- Expand rural availability of enhanced production inputs including improved seed varieties, water, fertilizers, pesticides, and fungicides to help protect farmers' crops against environmental risk (like pest damage, drought, and disease).
- Introduce post-harvest technologies adapted to local context in terms of the technology's requirement which is believed to alleviate the issues regarding the perishable crops and other post-harvest loss.
- Introduce risk-smoothing financial protection measures for farmers (i.e. a farmers' insurance program) to encourage the uptake of healthy food production practices among risk-averse households.
- In communities where resistance to new recommended dietary regimens is strong, consider alternate nutritional interventions, including introduction of production of bio-fortification staple crops.
- Continue and enhance engagement of highly influential individuals like religious leaders, Kebele Administrators, managers and other elders in efforts to transform community attitudes and social norms around nutritious food production and consumption.
- Invest in increasing the depth of understanding among communities about the benefits of nutritious food and expand this education to promote involvement of new community members (beyond model farmers and MVHHs).
- Build on momentum from SNNPR to improve and expand efforts aimed at creating market linkages for farmers to sell their surplus nutrient-rich crops and small animal products.
- Enhance the establishment of mini marketing linkages within small villages that can improve selling and buying of small-scale vegetables and fruits, in order to improve access to nutritious food and elevate household earnings.
- Expand the best practices among community members through cross visit and farmers day through any possible mechanism.

XX

Annexes:

Table 1: Study Area and participants of FGD and KII people

Study Participants by Region, AEZ & Respondent Type			
Region	Amhara	SNNP	Total

Woreda (AEZ)	Enemaye (Highlands)	Baso Liben (Midlands)	Takusa (Lowlands)	Gumer (Highlands)	Cheha (Midlands)	South Ari (Lowlands)	
(A) Focus Group Discussions							
Model Farmers (Doers)	15 (2)	24 (2)	32 (4)	29 (4)	37 (5)	28 (4)	165 (21)
Model Farmers (Non-Doers)	0	0	9	0	0	0	9
MVHHs (Doers)	31 (4)	30 (4)	29 (4)	20 (2)	16 (2)	18(2)	144 (18)
MVHHs (Non-Doers)	0	0	0	0	0	0	0
Total Number of FGD Participants	46 (6)	54 (6)	70 (8)	49(6)	53 (7)	46(6)	318 (39)
(B) Key Informant Interviews							
Woreda Health Office	1	1	1	1	1	0	5
Woreda Agriculture Office	1	1	1	1	1	1	6
Health Extension Workers	1	0	1	2	1	1	6
Agricultural Extension Workers	1	1	1	2	1	1	7
Kebele/Manager	1	1	1	0	0	0	3
In-depth interview Project participants	0	2	5	3	3	3	16
Total KIIs	5	6	10	9	7	6	43

***Note: Number in brackets is number of FGDs**

Table 2: Production Patterns by Woreda&Agro-Ecological Zone

Crop Production	Amhara			SNNPR		
	Enemaye (Highland)	Baso-Liben (Midland)	Takusa (Lowland)	Gumer(High land)	Cheha (Midland)	South Ari (Lowland)
Staples food crops produced in terms of importance	1.Teff 2. Guaya 3. Wheat 4. Chick peas 5. Maize 5. Barley 7. Millet	1. Teff 2. Maize 3. Wheat 4. Barley 5. Fabien	1. Red Pepper 2. Teff 3. Wheat 4. Maize 5. Millet 6. Beans 7. Vetches	1. Enset 2. Beans 3. Barley	1. Enset 2. Teff 3. Barley	1. Maize 2. Barley 3. Wheat 4. Sorghum 5. Moringa 6. Sweet Potato 7. Haricot Bean
	*Combined consumption of all in the form of low cost Injera					

Vegetables and Fruits	1. Onion 2. Cabbage 3. Tomato	1. Potato 2. Tomato 3. Greenpepper 4. Cabbage	1. Cabbage 2. Beet root 3. Carrot 4. Potato 5. Kale	1. Apple 2. Spinach	1. Cabbage 2. Onion 3. Garlic 4. Tomato 5. Carrot 6. Potato 7. Avocado 8. Papaya	1. Papaya 2. Green Peas 3. Banana 4. Potato
Cash Crops	1. Teff (White) 2. Chick Peas	1. Teff (White) 2. Chick Peas	1. Red Pepper 2. Spices	1. Barley	1. Chat 2. Coffee 3. Gesho 4. Avocado	1. Chat 2. Maize 3. Mango 4. Avocado
Relishes	Vetches and Beans *Together used to make shiro (compliment of injera)			1. Beans	1. Avocado 2. Local Cabbage	1. Fababean

Table 3: Consumption Patterns disaggregated by Agro-Ecological Zone & Region

Household Consumption Patterns		
AEZ	Amhara Region Woredas	SNNP Region Woredas
Lowlands	<p>Takusa</p> <p>Staple: Teff (red), Wheat, Maize, Millet</p> <p>Compliments: Beans, Vetches, Chickpeas</p> <p>Vegetables: Onion, Potato, Cabbage, Carrot (mostly during rainy season or for special occasions)</p> <p>Fruits: Banana, Avocado, Mango, Tomato (rarely and only for small children).</p> <p>Animal Product: Egg and very rarely meat</p>	<p>South Ari</p> <p>Staple: Maize, Barley, Wheat, Sorghum</p> <p>Compliment: Cabbage, Green Collard</p> <p>Vegetables: Onion, Potato, Cabbage</p> <p>Fruit: Mango, Papaya, Banana, Avocado</p> <p>Animal product: Egg and Milk commonly and meat very rarely.</p>
Midlands	<p>Baso-Liben</p> <p>Staple: Teff (red), Maize, Wheat, Barley</p> <p>Compliments: Chickpeas, beans, vetches</p> <p>Vegetables: Cabbage/Collard Greens (preferred), Potatoes, Green Peppers, Carrots, Pumpkin (not-preferred)</p> <p>Fruits: Banana</p> <p>Animal products: Egg, Milk and very rarely meat.</p>	<p>Cheha</p> <p>Staple: Enset, Wheat, Potato</p> <p>Compliments: Cabbage, Avocado</p> <p>Vegetables: Local Cabbage, Onion, Potato</p> <p>Fruits: Avocado, Mango, Papaya, Tomato</p> <p>Animal products: Milk (cheese), Egg and meat</p>
Highlands	<p>Enemaye</p> <p>Staple: Teff (red), Wheat, Maize, Barley, Lentils</p> <p>Compliments: Vetches, Chickpeas, Lentils</p> <p>Vegetables: Lettuce, Cabbage, Carrot, Potato, Green pepper</p>	<p>Gumer</p> <p>Staple: Enset, Barley</p> <p>Compliments: Potato, Beans, Peas, Avocado</p> <p>Vegetables: Carrot, Local Cabbage, Leaf Cabbage, Swiss Chard, Spinach</p>

	Fruits: Mango, Papaya, Banana, Tomato Animal products: Milk (cheese), Egg and very rarely meat.	Fruits: Apple (only the leftovers from sale) Animal products: Milk (cheese), Egg and meat.
--	---	--

Table 4: Factors which influence production and consumption practices among study respondents

BARRIER ANALYSIS: Model Farmers in SNNPR		
DECISION	PRODUCTION OF HEALTHY FOODS	CONSUMPTION OF HEALTHY FOODS
1	Shortage of land (thus preference for cultivating maximum-yield crops)	Lack of excess money incentivizes them to sell healthy foods (to increase household income) and prevents them from buying fruits/vegetables at market (particularly during the dry season when the cost is high and there is low availability)
2	Shortage of water (thus preference for cultivating weather-resistant crops)	Perish ability of fruits and vegetables causes them to sell the surplus (and go without during the dry season)
3	Livestock become sick and require expensive treatment	Local beliefs lower propensity to consume certain items (like yoghurt, etc.)
4	Weather damage and susceptibility of crops to frost	When cattle/hens are starved they don't produce milk/eggs
5	No access to pesticides, disease-prevention techniques and improved seeds	
6	High cost of production inputs (i.e. animals, fertilizer, insecticide)	
7	Lack of energy to follow up with vegetable production	
BARRIER ANALYSIS: MVHHS in SNNPR		
DECISION	PRODUCTION OF HEALTHY FOODS	CONSUMPTION OF HEALTHY FOODS
1	Shortage of land (not even enough to sustain annual consumption needs for staple crops)	Shortage of land (results in low capacity to produce non-staple vegetables)
2	Preference for low-cost, maximum-yield staple crops (since maximizing calorie intake is key for MVHHS)	Shortage of money (MVHHS are often too poor to buy vegetables, fruits and animal products at market, particularly during the dry season when costs are high)
3	laziness to engage in laborious work in the field.	

BARRIER ANALYSIS: Model Farmers in Amhara		
DECISION	PRODUCTION OF HEALTHY FOODS	CONSUMPTION OF HEALTHY FOODS
1	Shortage of water	Preference for buying other items at market (i.e. alcohol, coffee) and general hesitance to spend money buying healthy foods at market , when caloric needs are satisfied
2	Shortage of land	Local beliefs about the hazards of consuming certain foods (i.e. belief beetroots cause hemorrhoids, etc.)
3	Preference to produce cash crops and staples (i.e. prioritizing money over nutritional intake and health)	Seasonality of produce & lack of fruits and milk available at market (due to perish ability)
4	Animal damage, disease & crop infestations (i.e. insect issues, livestock getting sick)	Household financial constraints (i.e. shortage of money for other needs including seeds, fertilizers, and land rentals)
5	Lack of awareness about fruits/vegetables until recently (i.e. focus on crops farmers are already familiar with)	Farmers sell best products at market to enhance household savings

6	Lack of labor (to care for animals)	
7	Lack of extra money to dig wells or buy pumps for irrigation (i.e. challenging soil behavior)	
8	Women's exclusion from the production decision-making process	
9	Conflicts relating to livestock damaging crops	
BARRIER ANALYSIS: MVHHs in Amhara		
DECISION	PRODUCTION OF HEALTHY FOODS	CONSUMPTION OF HEALTHY FOODS
1	Shortage of land	Lack of excess money (they find it difficult to purchase vegetables from the market outside of those which they consider essential – like onions and cabbages; they prefer to buy other household items like coffee)
2	Shortage of water	Perish ability of fruits/vegetables (may requires to sell produce rather than saving it for household consumption)
3	Shortage of money (to rent/lease land or to afford other production inputs)	Lack of fruits and milk available at market (due to seasonality of harvest)
4	Animal damage, disease & crop infestations (i.e. insect issues, livestock getting sick)	Not accustomed to some vegetables & fruits (i.e. they miss their old diets)
5	Lack of community support (i.e. belief women should stay home with children)	
6	Lack of labor (to help with farming and care for animals since many MVHHs are headed by widows)	