



# FEED THE FUTURE

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



## Impact Evaluation: Integrating Nutrition in Value Chains (INVC) in Feed the Future Malawi

Baseline Report

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## List of Acronyms

ACE	Agricultural Commodity Exchange
ADMARC	Agricultural Development and Marketing Corporation
ANC	Antenatal Care
BFS	Bureau of Food Security
CADECOM	Catholic Development Commission of Malawi
CCG	Community Care Group
CM	Centimeter
CPI	Consumer Price Index
CSO	Civil Society Organization
DAI	Development Alternatives Incorporated
DID	Difference-in-Differences
FANTA	Food and Nutrition Technical Assistance
FGD	Focus Group Discussion
FPC	Finite Population Connection
FTF FEEDBACK	Feed the Future FEEDBACK
FUM	Farmer's Union of Malawi
GAC	Group Action Committee
GIS	Geographic Information Systems
GVH	Group Village Headman
HSA	Health Surveillance Agent
IHS	Integrated Household Surveys
IITA	International Institute for Tropical Agriculture
INVC	Integrating Nutrition in Value Chains
IP	Implementing Partner
IRB	Institutional Review Board
KG	Kilogram
LUANAR	Lilongwe University of Agriculture and Natural Resources
MDHS	Malawi Demographic and Health Survey
MWK	Malawi Kwacha
MMPA	Malawi Milk Producer's Association
NASFAM	National Association of Smallholder Farmers

MUAC	Mid-Upper Arm Circumference
NSO	National Statistics Office
ODK	Open Data Kit
OPV	Oral Polio Vaccine
ORS	Oral Rehydration Salts
PBS	Population-Based Survey
PI	Principal Investigator
PLW	Pregnant or Lactating Women
PPP	Purchasing Power Parity
SAM	Severe Acute Malnutrition
SD	Standard Deviation
SUN	Scaling-Up Nutrition
TA	Technical Assistance
UNC	University of North Carolina
USAID	United States Agency for International Development
VC	Value Chain
VHC	Village Health Clinics
WHO	World Health Organization
WRA	Women of Reproductive Age

## Executive Summary

Feed the Future is a United States Government initiative that aims to reduce hunger and poverty by accelerating growth in the agricultural sector, improving food security, addressing the root causes of under nutrition, and reducing gender inequality. Integrating Nutrition in Value Chains (INVC) is the flagship Feed the Future Malawi activity committed to improving food security and nutrition in farming households while reducing rural poverty through an agriculture-led, integrated economic growth, nutrition, and natural resource management strategy. The activity targets groundnuts, soybeans and dairy; three primary value chains (VC) commonly consumed with promising economic and nutritional return on investment.

The goal of the impact evaluation is to determine whether integrating nutrition interventions alongside agricultural value chain interventions will contribute to a greater reduction in malnutrition among children under 3 years of age, compared to nutrition improvements anticipated from stand-alone value chain activities. Baseline values for key evaluation indicators are presented in Table I.

**Study Methods.** Fifty-four Group Action Committees (GACs) were randomly assigned to treatment (value chain and nutrition) and comparison (value chain only) arms across Lilongwe and Mchinji districts. Household interviews were completed August-October 2014 for 3,555 households with anthropometric measures recorded for 3,795 children under 3 years of age. The relative impact of the Integrating Nutrition in Value Chains (INVC) program on nutrition outcomes at endline in 2017 will be estimated using a difference-in-differences (DID) estimation strategy.

**Balance.** The difference in means between treatment and comparison groups was tested using a regression model for all key indicators and a number of socio-demographic household and individual variables. Key study indicators are presented in Table I. Significant differences in baseline means for these indicators are noted with an asterisk. The treatment and comparison groups were not balanced in 39 (31 percent) of the 126 variables tested for differences in mean values. There were no statistically significant differences at baseline for the key anthropometric measurements, use of health services, poverty, or group affiliation. However, significant differences between groups were found for food consumption by women of reproductive age, household food security, nutrition knowledge and household agricultural production and sales.

**Household Consumption Expenditures.** Mean and median daily per capita expenditures were comparable across study groups. Just over half of the households were below the national poverty line and a quarter were below the national food poverty line or counted as extremely poor. Food expenditures comprised the largest share of total daily expenditure per capita, 46.9 percent and 46.8 percent in treatment and comparison groups, respectively. Aside from food, the largest share of expenditures was for housing and utilities, comprising 23 percent of

daily per capita expenditures. Combined, food and housing make up about 70 percent of total per capita expenditures.

**Table 1. Key Indicators, Malawi 2014**

Indicator	Treatment	n	Comparison	n
<b>Under-nutrition</b>				
Prevalence of stunted children under 3 years of age	43.8	1,828	41.6	1,966
Prevalence of underweight children under 3 years of age	13.9	1,829	12.9	1,966
Prevalence of wasted children under 3 years of age	2.5	1,825	2.1	1,962
Mean length of children under 2 years of age (cm)	70.0	1,249	69.6	1,330
<b>Food consumption</b>				
Mean number of food groups consumed by WRA	3.1*	1,775	3.0	1,865
Prevalence of exclusive breastfeeding of children under 6 months of age	64.3	272	67.8	303
Prevalence of children 6-23 months receiving a minimum acceptable diet	13.4	962	10.4	1,003
<b>Food security</b>				
Prevalence of households with moderate or severe hunger	31.4*	1,713	27.0	1,837
Daily per capita expenditure for food (MWK)	170.70	1,715	166.54	1,839
Percentage of daily per capita expenditure on food	46.9	1,715	46.8	1,839
<b>Poverty</b>				
Percent of individuals living on less than \$1.25 per day	40.5	1,715	42.0	1,839
Percent of individuals below national poverty line	53.8	1,715	55.2	1,839
Daily per capita expenditures, mean (MWK)	333.92	1,715	326.31	1,839
Daily per capita expenditures, median (MWK)	269.29	1,715	262.21	1,839
<b>Nutrition knowledge</b>				
Know recommendation for exclusively breastfeeding	72.0	1,800	70.2	1,890
Know recommendation that pregnant women should eat more food, more protein-rich food and more iron-rich food	28.6*	1,800	32.2	1,890
Know four key times when hand washing is recommended	41.9**	1,800	46.4	1,890
<b>Use of health services</b>				
Percent of women with ANC visit during first trimester	16.6	1,264	17.3	1,289
Percent of women whose last birth delivered at a facility	90.1	1,613	92.3	1,759
Prevalence of children 0-35 months that received Vitamin A in past 6 months	82.1	1,820	83.5	1,960
Prevalence of children 0-35 months that received a facility growth monitoring visit in past 12 months	70.8	1,820	68.5	1,960
<b>Group affiliations</b>				
Percent of households participating in a Farmer's Group	12.8	1,677	11.2	1,786
Percent of caregivers active in a Community Care Group	4.8	1,777	5.0	1,872
<b>Agricultural activity by households that cultivate</b>				
Volume of groundnuts cultivated (kg)	318.0	821	288.6	863
Volume of groundnuts sold (kg)	209.8	484	226.6	480
Percent groundnut harvest sold last season	55.0**	484	59.1	480
Mean value of groundnut harvest sold (MWK)	15,174.32	484	15,640.50	480
Volume of soy cultivated (kg)	105.2**	605	132.4	597
Volume of soy sold (kg)	107.0	442	122.9	473
Percent soy sold last season	75.5*	442	78.9	473
Mean value of soy harvest sold (MWK)	14,654.02	442	15,468.55	473

**NOTE:** The number of observations varies within groups due to skip patterns and/or missing responses on key indicators.

Asterisks denote significant mean differences between treatment and comparison group baseline values; \*p-value<0.05, \*\*p-value<0.01.

**Farming.** Households surveyed almost universally owned or cultivated land in the last rainy season. Almost three-quarters of the households cultivated two or more crops; maize was the most prevalent crop followed by groundnuts and soy. Among the 59.6 percent of households cultivating groundnuts or soy, over half reported selling some of the harvest; half of the groundnut harvest was sold and three-quarters of the soy was sold. Fewer than 15 percent of households in the sample reported participating in either National Association of Smallholder Farmers (NASFAM) or Farmer’s Union of Malawi (FUM) farmer’s groups in the past year.

**Child Nutrition and Health.** Rates of exclusive breastfeeding among children under 6 months of age were comparable among treatment (64.3 percent) and comparison (67.8 percent) groups. Minimum acceptable diet (MAD) for older infants was also comparable, yet universally low; 13.4 percent and 10.4 percent met the MAD, respectively. The key impact indicator, prevalence of stunting among children under 3 years of age, was similar across the two study populations at baseline, both slightly exceed 40 percent. The data suggest that stunting is more prevalent among males and increases with age. As expected, prevalence of underweight and wasting were markedly lower than stunting.

Use of routine health services, including receipt of recent vitamin A and polio vaccine, was high among study subjects. Routine growth monitoring visits were reported by approximately 70 percent of the sample while home visits or use of therapeutic foods was noted by less than one-fifth of the sample.

**Women’s Nutrition and Health.** The mean number of food groups consumed by women of reproductive age (WRA), a measure of micronutrient adequacy of the diet, was significantly higher in the treatment group although not substantively meaningful; 3.1 and 3.0 mean food groups, respectively.

Over three-quarters of women received antenatal care (ANC) services during their last pregnancy and most received this care from a public sector nurse or midwife during the second trimester. Commonly reported services included weight measurement, dietary counseling, and blood pressure measurement. A large majority of women delivered most recently in a health facility and over half of these women received some postnatal counselling prior to discharge.

**Nutrition and Hygiene Knowledge.** Recommendations for breastfeeding and timing for introducing complementary foods was well known by the respondents, yet a majority of caregivers reported late introduction of solids/semi-solids. A majority also believed that infants should be given less food than usual when sick and more food than usual when recovering from sickness.

Approximately 70 percent of respondents recognized that lack of energy or weakness and loss of weight or thinness were signs of under-nutrition, yet only about 40 percent knew that a weak immune system and growth faltering may also indicate under-nutrition, while growth

monitoring was not routinely cited as a means to prevent under-nutrition. Over 70 percent of respondents in treatment and comparison groups thought their child was under-nourished and these respondents almost universally recognized under-nutrition as a serious health problem.

Almost one-third of women knew they should eat more food and specifically more protein- and iron-rich foods during pregnancy. Knowledge patterns were similar regarding nutrition for lactating women. Approximately half of the respondents had received information on what and how much food to eat when pregnant and lactating.

Approximately 40 percent of respondents reported receiving information about how to prepare groundnuts and soy. Under half of respondents knew at least four key times when hand washing is recommended; yet over four-fifths of respondents believed their child was at risk of illness from their not washing hands, and almost universally thought that the illness could be serious.

**Community Care Groups.** Participation in a community care group was low in both treatment and comparison groups in the last twelve months; fewer than 5 percent of women or caregivers reported participation.

**Community Characteristics.** Electricity, piped water and landline telephone services were extremely rare in the interviewed communities, both in treatment and comparison sites. A majority of communities reported primary access by a maintained dirt road and on average, the main road to the community was passable 7-8 months per year. Average distance to the closest daily, weekly, or Agriculture Development and Marketing Corporation (ADMARC) market ranged from 7.4 to 17.0 km. However distance to the closest location where someone could purchase common medicines was less than 5 km. Most sites had a government primary school within 3 km, while government secondary schools required on average, traveling 15-18 km. Just over 80 percent of communities did not have a health center; however, a majority reported having a health surveillance agent (HSA) working in the community. The average distance to the nearest health center was 10 km for the treatment group and 7.6 km for the comparison group.

NASFAM was active in 47.7 percent of treatment communities, compared to only 31.6 percent of comparison communities, while less than 2 percent of the communities reported FUM activity. Among those communities with active farmer's groups, approximately half of the groups have been active for less than one year.

Negative shocks were reported by a large number of communities and included livestock diseases and crop diseases or pests, human epidemics, and sharp change in prices. Positive economic shocks, such as development programs or off-grid electricity, were reported by fewer than one-quarter of the sites.

# I. Introduction and Background

This document is the baseline report for the impact evaluation of the nutrition component of USAID/Malawi's Integrating Nutrition and Value Chains (INVC) program. The impact evaluation is being implemented as part of the Feed the Future FEEDBACK (FTF FEEDBACK) activities and seeks to measure the impact of integrating nutrition and legume value chain interventions in two districts, Lilongwe and Mchinji. This report describes the status of households living in value chain areas prior to the implementation of the nutrition component of the program, and it provides an important basis for comparing changes over time in order to measure program impacts. The report also assesses the success of the study design, which entailed the random assignment of Group Action Committees (GACs) into treatment and comparison groups. Specifically, the report tests whether the treatment and comparison groups are balanced across a range of primary and secondary outcomes and key intermediate indicators.

## I.1 Feed the Future Overview

Feed the Future is a United States Government initiative that aims to reduce hunger and poverty by accelerating growth in the agricultural sector, improving food security, addressing the root causes of under nutrition, and reducing gender inequality. Feed the Future works in 19 focus countries worldwide. The United States Agency for International Development (USAID) is responsible for leading the government-wide effort to implement Feed the Future.

The impact evaluation for Feed the Future's INVC in Malawi is being undertaken as part of the FTF FEEDBACK project. FTF FEEDBACK is implemented by Westat in partnership with the Carolina Population Center at the University of North Carolina (UNC) at Chapel Hill and TANGO International. The main objectives of FTF FEEDBACK are to enable USAID Missions to meet the performance monitoring requirements of Feed the Future and maximize the use and benefits of data collected; provide high-quality empirical evidence to inform program design and investment decisions that will promote sustainable food security; ensure timely availability of high-quality data for use in monitoring performance and evaluating impacts of the Feed the Future initiative; and facilitate accountability and learning about which Feed the Future interventions work best, under what conditions, and at what cost.

## I.2 Malawi Country Context

Malawi, a landlocked country with 16.8 million people in 2014,<sup>1</sup> continues to struggle with high rates of malnutrition and food insecurity, which are closely linked to persistent poverty. Approximately 85 percent of the population is rural farmers who own an average of

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<sup>1</sup> [World Bank](http://data.worldbank.org/country/malawi). World Development Indicators, *Population*, 2015. Available at: <http://data.worldbank.org/country/malawi>

1.13 hectares of land, although one-third is estimated to own less than 0.7 hectares.<sup>2</sup> Maize is the primary staple crop, yet few small- and medium-sized landholders produce sufficient quantity to assure household food security and supplemental income through its sale. Most rural landowners face a hungry season after planting and before harvest due to their own depleted stores and lack of affordable, diverse food products in the marketplace. Moreover, subsistence farmers in Malawi are extremely vulnerable to climatic and agricultural shocks, such as floods, droughts, and crop failure. This compounds the pervasive malnutrition challenges faced by communities. According to the 2010 Malawi Demographic and Health Survey (MDHS), 47 percent of children under 5 years of age were stunted, indicating chronic under-nutrition, while 13 percent were underweight, a composite measure that takes into account acute and chronic malnutrition.<sup>3</sup>

The Government of Malawi has declared agriculture and nutrition as key national policy priorities. Donors are looking at the intersection of these efforts to maximize the economic and health benefits of an improved agriculture cycle. High impact nutrition interventions are promoted under the global Scaling-Up Nutrition (SUN) initiative, which targets the health infrastructure, community, households, and individuals to improve the nutrition practices of families during the 1000-day window from conception to the child's second birthday.

### 1.3 Integrating Nutrition in Value Chains (INVC)

**Objectives.** The Feed the Future initiative began implementing its flagship activity in Malawi, the INVC project, in 2012. INVC's goal is to advance food security and nutrition in farming households while reducing rural poverty through an agriculture-led, integrated economic growth, nutrition, and natural resource management strategy. The activity targets three primary value chains (VC): groundnuts, soybeans and dairy<sup>4</sup>, with plans to expand to orange-flesh sweet potatoes in the future. These VCs were selected because their products are commonly consumed and promise the highest economic and nutritional return on investment. More specifically, the objectives of the INVC project are to:

1. Improve productivity (land, water, labor) through soil and water management practices;
2. Increase competitiveness of the legumes (i.e., groundnuts and soybeans) and dairy value chains to mitigate food insecurity and increase incomes of the rural poor;
3. Reduce chronic under-nutrition;

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<sup>2</sup> Republic of Malawi, National Statistics Office. Third Integrated Household Survey, 2010-2011. Zomba, Malawi.

<sup>3</sup> Republic of Malawi, National Statistical Office and ICF Macro, 2011. Malawi Demographic and Health Survey 2010. Zomba, Malawi, and Calverton, Maryland, USA: NSO and ICF Macro.

<sup>4</sup> In 2014, the dairy value chain interventions were discontinued by INVC.

4. Improve value chain competitiveness and nutrition outcomes through the fostering of innovation in adaptive technologies and techniques that will increase participation of the poor in agriculture-led growth; and
5. Enhance capacity of local organizations and institutions developed to promote sustainability and climate change resilience.<sup>5</sup>

**Target Population.** INVC targets “the poor with assets.” These are the households that theoretically have sufficient agricultural assets to benefit economically from expanding and diversifying production yet remain vulnerable to external shocks, such as climatic or economic turbulence. Specifically, the INVC project targets households that:

- Cultivate between 1.25 to 3 acres (0.5 to 1.2 hectares) of land;
- Produce sufficient maize for home consumption;
- Have the potential to increase maize productivity and to free up land for crop diversification to legume production;
- Access extension services and inputs (seeds and inorganic fertilizers); and
- Have the potential for linking to markets.

**Interventions.** The INVC legume interventions aim to increase agricultural productivity, marketing, trade, and subsequently income for small and medium-size landholders with land available for crop diversification.<sup>6</sup> Agricultural extension agents work through farmers’ associations to target actors along the chain of production from initial inputs (e.g., improved seed and soil) through harvesting, storage, processing and marketing. For dairy farmers, VC investments in animal nutrition and health, dairy management, and hybrid breeding are spearheaded by the local milk bulking groups. Investments in these VCs aim to increase household agricultural production which in turn should result in additional products for household consumption and/or income generation through marketing channels.

In select districts, INVC integrates nutrition education and outreach with the legume VC interventions to improve household nutrition and health practices, with the goal of improving maternal and child nutrition. The primary mechanism for community nutrition advocacy, education and mentoring is peer education through Community Care Groups (CCG). The primary point of integration between the nutrition activities and the VC activities is at the level of the farmers association’s Group Action Committees or clusters (hereafter referred to collectively as GACs). With the CCG model, local Nutrition Promoters, recruited from the

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<sup>5</sup> Feed the Future- INVC Malawi, 2013. Second Quarterly Progress Report FY2013.

<sup>6</sup> Average landholding in Malawi was 1.13 hectares and the majority of farmers are categorized as medium-sized land holders owning 0.75-3.0 hectares. Source: Republic of Malawi, National Statistics Office. Malawi Second Integrated Household Survey, 2004-05. Zomba, Malawi.

farmer’s associations’ GACs, are trained to support community care groups. The CCG is a group of 10-12 lead caregivers. These CCG leaders provide an array of nutrition and health education activities to a locally formed group of mothers and caregivers. Twice monthly nutrition activities include promotion of healthy habits, consumption of fortified and diverse foods, cooking demonstrations, growth monitoring of children, and referral to health/nutritional facilities. Screening and referrals focus on primary maternal and child health services and referrals for therapeutic feeding for children suffering from severe acute malnutrition (SAM). These activities are directed at households with pregnant and lactating women and children under age 5, with an emphasis on children under 2. The activities are intended to increase household food consumption and nutrition by improving knowledge and practices that assure dietary diversity and appropriate care and feeding practices.

**Coverage.** The INVC project is being implemented in seven districts in the Central and Southern regions of Malawi: Mchinji, Lilongwe, Dedza, Ntcheu, Balaka, Machinga and Mangochi. Nutrition integration efforts have focused on more in-depth coverage in fewer geographic districts; Lilongwe and Mchinji initially in 2013 with expansion to Balaka, Machinga and Mangochi in 2014 (Figure 1.1).

Legume VC implementing partners initially targeted farmers already participating in one of their farmer’s associations, groups, or clubs, and then expanded membership in existing associations as well as established new clubs in communities in year two. INVC targets approximately 275,000 households, which is over 25 percent of the households in the target areas.

The nutrition intervention is integrated at the GAC through the appointment of the Nutrition Promoters. CCG leaders are recruited by Promoters from villages where farmer’s clubs adopting the VC work are active. Households with children under 5 years of age and/or with pregnant or lactating women (PLW) were encouraged to participate in the locally formed groups under the direction of a CCG leader.

**Figure 1.1. Map of INVC District**



**Implementing Agencies.** USAID/Malawi is applying a local solutions approach for INVC.<sup>7</sup> INVC is led by Development Alternatives Inc. (DAI), Michigan State University, and Save the Children US, with implementation undertaken by 7 locally-contracted civil society organizations (CSO). This approach requires contractual capacity building efforts to strengthen existing institutions, networks and expertise. In Malawi, INVC is relying exclusively on local CSOs for the implementation of the program, which has implications for quality and speed of project coverage given the capacity needs of the local partners. The seven local partners work as follows:

- **National Association of Smallholder Farmers (NASFAM).** Supports farmers to improve the VC for groundnuts and soy in six districts, including Lilongwe, and Mchinji.
- **Farmer's Union of Malawi (FUM).** Supports farmers for improved agriculture business enterprises for groundnuts and soy in Lilongwe, Mchinji, and Dedza.
- **Catholic Development Commission of Malawi (CADECOM).** Creates new farmer's groups to target VC activities for groundnuts and soy in Dedza.
- **Agricultural Commodity Exchange for Africa (ACE).** Provides structured trade and financing for smallholder farmers.
- **Civil Society Agriculture Network (CISANET).** Advocacy work for farmers.
- **Nkhoma Synod.** Provides community nutrition messaging and services through community care groups in Lilongwe and Mchinji.
- **Pakachere Institute for Health Development and Communication.** Produces nutrition and agriculture behavior change communications.

**Timing.** The three-year INVC project was awarded to DAI and partners Save the Children US and Michigan State University in April 2012 and extended in 2014 through September 2016. Local organizations active in the agriculture sector received grantee awards to strengthen the value chains for legumes and dairy in the seven target districts. Activities to improve agricultural productivity and diversity began in a few locations with the planting and harvesting season from November 2012 through May 2013; by the following season, all sub-agreements were awarded and operating. Sub-agreements for the nutrition activities were awarded in May 2013, Nutrition Promoters were selected by end of 2013, and training began in 2014 for the main sites. Selection and training of promoters for the additional study sites was planned for November 2014.

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<sup>7</sup> USAID, 2014. Local Systems: a framework for supporting sustained development. Available at: <http://www.usaid.gov/sites/default/files/documents/1870/LocalSystemsFramework.pdf>

## 1.4 Impact Evaluation of the INVC Program

**Objectives.** The Bureau of Food Security (BFS) and the USAID/Malawi Mission commissioned FTF FEEDBACK to conduct this impact evaluation of INVC. The intent of this evaluation is to measure the impact of integrating a nutrition component to VC activities on the nutritional status of children less than 3 years of age compared to similar children living in communities only exposed to VC activities. This impact evaluation will address a key question posed by the Feed the Future Learning Agenda, specifically whether integrating nutrition-related program interventions alongside agricultural value chain interventions will contribute to a greater reduction in malnutrition compared to stand-alone value chain activities. The evaluation relies on a quasi-experimental design with a population-based household survey at baseline and endline, plus qualitative data collected over the course of the project to inform the findings.

**Evaluation Questions.** Complementary questions will be answered by the quantitative, qualitative, and costing components of the impact evaluation.

**Quantitative Component.** For the questions below, the comparison is between the integrated INVC program and the stand-alone VC-only program.

### 1. *Effects on INVC-target communities*

**Primary Question.** Is INVC more effective in reducing chronic malnutrition among children under 3 years of age in integrated program areas (i.e., Nutrition and VC) compared to VC-only program areas?

Secondary questions measure effects on intermediate outcomes along the causal pathway from the program to nutritional status. Intermediate outcomes to be examined include: household food consumption, household food security, household knowledge of nutrition and feeding practices, dietary diversity for women of reproductive age, dietary diversity for children under 2, and use of maternal and child health services. In addition, indicators tracking consumption of targeted VC products specifically will be collected.

### 2. *Effects on direct VC beneficiaries*

**Primary Question.** Is the integrated VC+Nutrition program more effective in improving nutritional status among children under 2 (measured by linear growth) in VC-beneficiary households compared to similar children from VC-beneficiary households that receive a VC-only program?

Secondary questions measure effects on intermediate outcomes along the causal pathway with comparisons between VC-beneficiary households receiving a VC-only intervention, and direct VC-beneficiary households in VC and Nutrition integrated communities. Intermediate outcomes to be examined include: household food consumption, household food security, household knowledge of nutrition and

feeding practices, dietary diversity for women of reproductive age, dietary diversity for children under 2, and use of maternal and child health services.

**Qualitative Component.** The qualitative component was designed to complement the quantitative analysis and answer two key questions:

1. How were the interventions implemented?
2. How did the different VC and nutrition interventions influence the steps along the causal pathways leading to reduced stunting in children under 3 years of age?

**Costing Component.** The costing component complements the study by answering:

1. What is the average unit cost of stunting case averted by the addition of the nutrition component to the VC component?

**Design and Timeline.** This prospective evaluation relies on two repeated cross-sectional household surveys with an embedded longitudinal subset of households and complimented by qualitative work. The baseline survey was completed between August-October 2014 with endline data collection planned for 2017. Qualitative data collection is planned intermittently during 2015-2016, with additional interviews and focus group discussions at endline. Costing data from the implementing partners for the nutrition and VC work will be collected throughout the life of the study.

## 1.5 Baseline Survey Objectives

The baseline survey was designed to measure baseline values for the primary and secondary outcomes of interest in the treatment and comparison groups and to determine whether the two groups were balanced at baseline. With an endline survey planned in 2017, the quantitative survey further aims to support evaluation of project impact on these outcomes through a difference-in-differences (DID) approach comparing pre-post differences in outcomes between the treatment and comparison groups.

## 2. Theory of Change

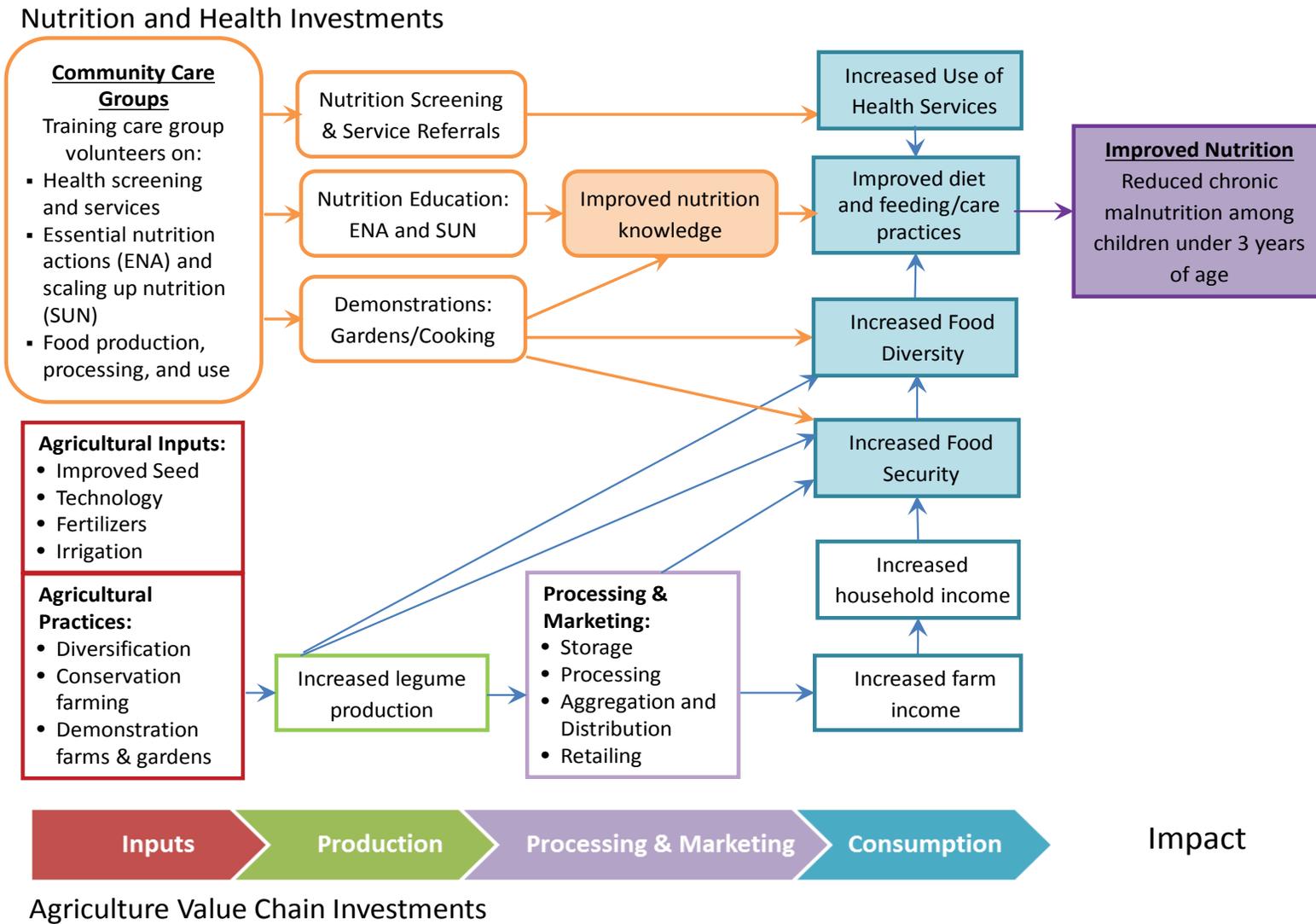
An agriculture value chain project, such as INVC, assumes that value chain activities targeting nutrient-rich products will improve household nutrition (Figure 2.1). The causal pathway posits that inputs such as improved seed, fertilizers, and cropping techniques, will increase legume productivity. Higher production will contribute to increased consumption as well as stimulate increased processing and marketing, with some VC interventions linking farmers with markets and processors. Expanded marketing will lead to higher farm income, which will lead to increased household consumption. Increased food production and income should lead to greater household food security, enhanced dietary diversity, and improved nutrition. Additionally, expanded community-level processing will lead to better access to these products in the community.

Singular agricultural interventions may address the underlying causes of malnutrition, such as scarcity of assets including food and income, but they may not necessarily improve household nutrition. Nutrition-specific interventions, including nutrition education, supplementary feeding, and micronutrient fortification, address the immediate determinants of the undernourished populations. The VC interventions serve as a platform on which to build nutrition activities, but there are challenges to be considered. Value chains, even those that promote a nutrient-rich product, focus on a single agricultural product that cannot meet all family nutritional needs. Income and overall food security may increase but the singular VC interventions are not designed to target childhood nutritional needs.<sup>8</sup> Another challenge may be the feasibility of relying on agriculture extension workers to adequately undertake nutrition messaging given their workload and area of expertise.

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<sup>8</sup> Ruel MT, Alderman H. Nutrition-sensitive interventions and programmes: how can they help to accelerate progress in improving maternal and child nutrition? *Lancet* 2013, 382:536-551.

**Figure 2.1. Causal pathways for the integrated legume value chain and nutrition program**



## 3. Methodology

### 3.1 Evaluation Design

The research team developed a prospective, experimental research design using pre- and post-treatment measurements with longitudinal data. With random assignment of the nutrition intervention at baseline, the relative impact of the integrated INVC program on nutrition outcomes three years later at endline will be estimated using a DID estimation strategy (see the sub-section on contamination in Section 3.3). The key nutrition outcome, prevalence of stunting among children under 3 years of age, will be measured across the entire community using village panel data. A subset of households will also be tracked from baseline to endline to measure changes in linear growth among a panel of children under 2 years of age at baseline.

The cross-sectional baseline survey sampled households with children under 3 years of age from treatment and comparison villages in 2014. Since children who were 0-35 months at baseline will be 36-71 months in 2017, the endline survey will select a new random sample of households with children under 3 years of age from the same villages sampled at baseline. The repeat cross-sectional survey will be used to measure changes in prevalence of stunting in the study areas. By conducting the surveys in the same villages, control of community unobservables using a fixed effects specification in a DID model is planned. An additional impact analysis comparing linear growth between 2014 and 2017 for children, who were under 2 years of age at baseline, will be conducted between treatment and comparison groups, with the expectation that children in the treatment group will be taller in 2017 than the comparison group. That analysis requires an embedded panel of households interviewed at baseline and re-interviewed at endline. Tracking a panel of children permits the examination of the relative effect of the integrated program on linear growth while controlling for individual and household unobserved characteristics that are fixed during the three years of observation.

### 3.2 Study Population

The implementation strategy for the INVC program is to first target existing or create new GACs for legume-VC interventions. The VC work started in late 2012 and continued expanding coverage each year. The entry point for nutrition integration is the GAC. Starting in fall 2013, INVC sensitized 324 GACs in Lilongwe and Mchinji about the nutrition interventions and solicited application for nutrition promoters from interested GACs. Criteria set by Nkhoma and INVC were used to shortlist applicants from approximately 229 GACs with active VC clubs; however, INVC funding constraints and Nkhoma capacity limitations did not permit supporting all 229 GACs. Nkhoma began nutrition work in approximately three-quarters of the shortlisted GACs, leaving 54 GACs which met the nutrition selection criteria but were unfunded for nutrition integration. These 54 GACs became the study population of interest for

the evaluation. In August 2014, all 54 GACs were randomly assigned to treatment and comparison groups. This randomization was done by stratifying by VC implementing partner (FUM and NASFAM) to account for the possibility of different implementation of the VC intervention by partner.

### 3.3 Sampling Design

The baseline survey adopted a two-stage sampling design to obtain a representative sample of eligible households from villages in the 54 target GACs. Eligible villages were those receiving the value chain intervention but not receiving the integrated nutrition intervention. Eligible households were those households with at least one child under 3 years of age. In the first stage, 100 percent of target GACs and all eligible villages in those GACs were selected. The second stage involved selection of up to 20 eligible households per village. In villages with more than 20 eligible households, 20 eligible households were selected randomly.

**Sampling Frame.** NASFAM and FUM, the VC implementing partners, work through farmer's associations or groups to share VC knowledge, technologies and strategies. Individual clubs form at the village level. One association or group may sponsor several clubs in the village, and multiple clubs from separate villages come together to form an association GAC. The GACs do not have officially defined geographic boundaries or population size measures, rather they are a group of villages located in proximity to one another. In Lilongwe and Mchinji, the 54 VC-only GACs included 580 villages reported by NASFAM and FUM as locations where at least one VC participant lived and where no INVC-related nutrition activities were underway. All households with children under 3 years of age in these 580 villages constituted the sampling frame for the baseline survey.

**Sample Size Estimation.** The final sampling plan was designed to recruit 5,300 households with children under 3 years of age across the 54 GACs, split evenly between treatment and control sites.<sup>9</sup>

The sample size estimates were powered on two key nutrition indicators, namely:

- Prevalence of stunting among children under 3 years of age; and
- Linear growth for a longitudinal sample of children under 2 years of age at baseline.

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<sup>9</sup> The original sampling plan called for 6,420 households with children under 3 years of age and is detailed in the IE study protocol. Upon initiation of fieldwork, new information required revising the sampling plan. The revised plan is presented in this report.

The initial sample size calculations were based on estimated sampling parameters (e.g., baseline indicator values, design effects, population estimates) using data from the 2010 MDHS<sup>10</sup> and the 2009 Malawi Statistical Yearbook.<sup>11</sup> Additionally, the sample size was adjusted upwards by 8 percent to accommodate potential village non-compliance with the random treatment assignment, and the size of the panel subset of children under 2 years was increased an additional 10 percent to account for loss to followup.

At the time of household listing, it was revealed that the original population estimates overestimated the actual population counts by village and by household with children under 3 years of age. Instead of a projected sampling frame of 20,680 eligible households, the household listing identified only 7,213 households with children under 3 years of age living in the 54 study GACs. A finite population correction (FPC) factor<sup>12</sup> was applied to the sample size calculations to produce the final target sample size as noted in Table 3.1.

**Table 3.1. Sampling parameter assumptions and specifications**

Indicator	Baseline value	Endline value	Minimum detectable change	Design effect	Significance level	Power	FPC	Target sample size
Stunting <sup>1</sup>	45.5%	42.5%	3 ppc	2.37	5%	80%	0.2586	5,348
Linear Growth <sup>2</sup>	Mean: 70.9 cm SD: 7.9 cm	73.1 cm	2.2 cm	2.33	5%	80%	–	1,423

<sup>1</sup> Among children under 3 years of age.

<sup>2</sup> Among children under 2 years of age and living in a direct VC Beneficiary household.

**Sampling Procedures.** Based on the revised sampling frame, the team conducted a census of all active VC villages that had not yet received any nutrition interventions in the 54 study GACs. Each GAC covered one or more villages; all villages were selected. Within each village, only households with children under 3 years of age were eligible for inclusion. All children under 3 years of age in a selected household were measured.

**Contamination.** At the beginning of February 2015, after baseline data collection had been completed, UNC was notified of probable contamination in the study sites. Nutrition promoters reported operating in 184 of the 569<sup>13</sup> study villages (32.3 percent) since January 2014. The contaminated villages included both treatment sites receiving the intervention prior to baseline data collection and comparison sites receiving the nutrition intervention despite the intent to only offer VC work; 24.7 percent of treatment villages and 38.4 percent of comparison villages were contaminated. Removing these contaminated villages from the sample

<sup>10</sup> National Statistical Office and ICF Macro, 2011. Malawi Demographic and Health Survey 2010. Zomba, Malawi, and Calverton, Maryland, USA: NSO and ICF Macro.

<sup>11</sup> National Statistical Office. Statistical Yearbook 2009. Zomba, Malawi. Accessed June 2014: <http://www.nsomalawi.mw/publications/statistical-yearbooks/78-statistical-yearbook-2009.html>

<sup>12</sup> Cochran, William G, 1967. Sampling Techniques, 2<sup>nd</sup> Edition. John Wiley and Sons, Inc.

<sup>13</sup> Sampling frame listed 580 villages but listing and fieldwork reduced number to 569; see Fieldwork section below for details.

reduced the study population by approximately one-third. Using data from the household listing, the estimated minimum detectable change for stunting among children under 3 years of age was recalculated. The estimated total population of children under 3 years of age in the remaining study sites is approximately 4,993. Applying a FPC factor (0.247) to the uncontaminated sample, a 3.5 percentage point change in prevalence of stunting from baseline to endline with 80 percent power and 95 percent significance will be detectable with the final uncontaminated sample (N=3,808). Unfortunately the remaining uncontaminated sample will not support analysis of the direct VC beneficiary population due to small representation of the beneficiary population at baseline. All tables and analyses presented in the remainder of this report are based on the sample from the final, uncontaminated study population.

**Design and Sampling Weights.** The weights for households and individuals were calculated using the uncontaminated sample and included sampling design probabilities and adjustments for nonresponse. See Appendix A for details.

### 3.4 Survey Instruments

For the baseline survey, three instruments were used for data collection: a household survey, an individual survey, and a community survey. These instruments are described below and available in Appendix F.

- **Household Survey.** The household survey collected socio-demographics for all household members, information on dwelling characteristics, household consumption expenditures, household hunger, and level of participation in VC activities and in other programs. The tool also included a short module on agriculture production, sales, and agricultural income. The target respondent was the household head or the person most knowledgeable about household consumption. Often both a male household head and his spouse responded jointly to the household survey.
- **Individual Survey.** The individual survey collected information on use of health services and dietary diversity for women of reproductive age; feeding practices, dietary diversity, and use of health services for children under 3 years of age; and knowledge of nutrition and sanitation, and participation in a community care group or other programs. Anthropometric data, specifically mid-upper arm circumference (MUAC), height and weight were collected for all children under 3 years living in the household, per the consent of the caregiver. The target respondents included women of reproductive age and primary caregivers of children under 3 years of age.
- **Community Survey.** The community survey collected information on basic characteristics of the community such as location, size, distance to larger towns and markets, availability and distance to sources of health services and schools, availability and distance to growth monitoring and nutrition services, presence of other development programs in the community, and occurrence of natural events. Data were collected from 5-10 community members in a group meeting.

## 3.5 Training and Fieldwork

The baseline survey was implemented by Lilongwe University of Agriculture and Natural Resources (LUANAR) with assistance from Westat and an independent consultant, and under the guidance of UNC.

### *Training*

**Supervisor Training and Pre-Testing.** Ten supervisors were trained by LUANAR and UNC staff. Training occurred from July 30 – August 1, 2014, and was held at LUANAR's campus in Bunda. Training topics included an introduction to the study and a detailed review of the survey instrument, enumerator manual, supervisor manual, consent process, and household selection process. Supervisors were also trained on the use of Nexus tablets equipped with Open Data Kit (ODK) software for data entry and management by Westat staff.

The pre-test of the baseline survey was held in Lilongwe District near the campus on August 2, 2014. The pre-test was conducted by ten supervisors and observed/assisted by two survey managers, two Westat tablet experts, and one UNC staff. Minor revisions were made to the instrument following the pre-test.

**Enumerator Training.** Training for 80 enumerators took place at the LUANAR campus from August 5-15, 2014. After introductions and an overview of the project, candidates were trained on the use of tablets by Westat staff. Other training topics included a detailed review of each survey module during which the intent of all questions and responses were reviewed. The Chichewa translation of each question was also reviewed to ensure appropriate translation. In addition, enumerators were trained on human subjects' protection, and interviewing techniques. Photo Aids, hard copy questionnaires, and manuals were provided to all enumerators and supervisors to assist in learning the different survey modules. Training included daily role plays and tablet practice, as well as a day of field practice in a nearby village during which each candidate conducted one complete practice interview.

**Anthropometrist Training.** During the enumerator training, 10 enumerators with the best anthropometric measurement skills were selected as anthropometrists. These specialists received specialized training and practice on the consent process for anthropometry and the different height/length, weight, and MUAC measurements. One anthropometrist was assigned to each survey team and was responsible for measuring all children under 3 years of age.

**Household Lister Training.** Two household listing teams were established, each with one supervisor and 5-6 enumerators. Teams were provided an introduction to the study and received training on the identification and enumeration of households.

## Fieldwork

**Household Listing.** The teams were charged with locating the villages selected by the UNC researchers, introducing the study to the village leaders, and facilitating a household identification process. All 580 villages in the 54 GACs were visited and the listing process was completed August 13-September 15, 2014. The listing data included the total number of households in the village, the number of households with children under 5 years of age, and the number of households with children under 3 years of age. First the listers interviewed a small group of village leaders to enumerate the total number of households. Next, all households reported by village leaders as having a child under 5 years of age were visited to confirm the age of the children and to finalize counts for households with children under 3 years of age. In total, 22,316 households were identified; 7,347 of the households with a child under 3 years of age were listed. In villages where the number of households with children under 3 years of age exceeded the number needed for sampling, the listers returned to the village leaders and publicly performed the random selection as follows: All household names with children under 3 years of age were written on slips of paper and placed in a bowl or basket. The bowl was shaken several times by the lister. The lister then held the bowl above eye-level and asked members of the community to select names until the sample size was met. The selected household names and contact information were recorded for the data collection teams to interview.

**Data Collection.** Data collection occurred from August 20 – October 24, 2014 in Lilongwe and Mchinji districts. Each of the 10 data collection teams was comprised of one supervisor, one anthropometrist, and 7 enumerators. Data were collected in 569 of the 580 villages listed. Seven villages were excluded because there were no households with children under 3 years of age, and four villages were not found or visited by data collectors.

**Data Quality Control.** Data quality was ensured at several levels. At the tablet level, the survey was programmed so that questions could not be skipped. Numerous quality checks were also built into the programming that identified inconsistencies and prevented enumerators from moving forward with the survey until errors were corrected. Supervisors monitored enumerator performance by observing interviews, conducting spot checks, and reviewing survey responses in the tablet for completeness and consistency before finalizing and transmitting questionnaires to the Westat server. The LUANAR Principal Investigator (PI) also provided another layer of quality control, visiting each team to observe interviews and review household listings, sampling selections, and enumerator and supervisor control sheets.

A final level of data quality control involved the use of quality control reports that were automatically generated by the Westat server and reviewed routinely by a UNC staff person throughout the data collection period. The reports contained information on household identification numbers, number of completed interviews, number of children with completed

anthropometric measurements, and quality of measurement, among other information. Using these reports, UNC communicated with the LUANAR PIs to alert them to any errors (e.g., duplicate household identification numbers), collect corrected information, and upload corrections to the Westat server.

**Data Processing and Confidentiality.** The Nexus tablets used for data collection were password protected and their hard drives were encrypted. Supervisors reviewed each enumerator's completed surveys, finalized them, backed them up on the enumerator's tablets by making a copy on the tablet itself, and also transferred a copy from the enumerator's tablet to their own (supervisor's) tablet. Supervisors transmitted completed surveys (encrypted) to the Westat server whenever they had Internet access. Once transferred, data were stored on a secure server at Westat. To ensure data protection and confidentiality across the study, all partners signed a data-use agreement and committed to using reasonable data protection measures, as outlined in the agreement and the IRB, to protect the data. When data collection was complete, tablets were returned to Westat, checked for completeness of data delivery, and cleared of all survey data. Handwritten records from the household listing, including household listing books and maps, were stored in locked file cabinets.

### 3.6 Data Analysis

Quantitative data analysis was conducted in Stata 13.1 (Stata Corp LP, College Station, Texas). Analysis in this baseline report includes basic descriptive frequencies and some statistical testing of mean differences to test for balance across the treatment and comparison groups. Emphasis has been placed on the comparability of the treatment and comparison groups on observable characteristics at baseline. Indicators are reported primarily as either percentages or means, and weighted using the sampling weights.

## 4. Baseline Survey Response Rates

Interview results and response rates are presented in Table 4.1. In total, 3,698 households were selected after screening for eligibility; 1,781 from treatment sites and 1,917 from comparison sites. In just over three percent of the households, no one was home to participate and another handful of households refused participation. This resulted in high response rates for both treatment (96.3 percent) and comparison (96.0 percent) groups. Among the respondent households, the intent was to interview the primary caregivers for any children under 3 years of age and all WRA, and to measure all children under 3 years of age with the consent of the caregiver. Response rates for each of these target populations were over 99 percent in both treatment and comparison sites. Response rates were much lower for the community survey, with about 75 percent of communities completing a group interview.

**Table 4.1. Results of the household, individual, and community interviews**

Characteristics	Treatment	Comparison	Total number
<b>Households</b>			
Number selected	1,781	1,917	3,698
Number not found/absent	60	64	124
Number refused/incomplete	6	13	19
Number interviewed	1,715	1,840	3,555
Response Rate	96.3	96.0	96.1
<b>Caregivers</b>			
Number selected	1,761	1,872	3,633
Number refused/not found/incomplete	6	7	13
Number interviewed	1,755	1,865	3,620
Response Rate	99.7	99.6	99.6
<b>Women of Reproductive Age (WRA)</b>			
Number selected	1,870	1,951	3,821
Number refused/not found/incomplete	5	8	13
Number interviewed	1,865	1,943	3,808
Response Rate	99.7	99.6	99.7
<b>Children under 3 years (measurements only)</b>			
Number selected	1,836	1,980	3,816
Number refused/not found/incomplete	7	14	21
Number interviewed	1,829	1,966	3,795
Response Rate	99.6	99.3	99.4
<b>Communities</b>			
Number selected	189	196	385
Number refused/not found/incomplete	59	38	97
Number interviewed	130	158	288
Response Rate	68.8	80.6	74.8

## 5. Balance of Evaluation Groups

The primary purposes of the baseline survey are, first, to measure key intermediary and outcome measures at baseline before receipt of the nutrition intervention, and, second, to test whether the treatment and comparison groups are balanced at baseline, that is, to examine whether the randomization process succeeded in generating similar treatment and comparison groups. With the known contamination noted in chapter 3, testing between the uncontaminated treatment and comparison groups was imperative to determine whether the population groups in the study were comparable at baseline.

Mean differences at baseline between treatment and comparison groups were tested for 132 household and individual variables (see results in Appendix B). The randomization process, when limited to the uncontaminated sites, did not produce balanced groups at baseline; 42 (32 percent) of the variables were significantly different at the 5 percent level. However, there were no statistically significant differences at baseline for the key anthropometric measurements, use of health services, poverty, or group affiliation. There were significant differences between groups for food consumption by WRA, household food security, nutrition knowledge and household agricultural production and sales.

Significant and substantively meaningful differences at baseline for select intermediary outcomes along the causal pathway may have implications for key outcomes over time. For example, caregivers in the comparison sites reported better nutrition knowledge and better household food security. According to the theory of change, both of these factors contribute to improved diet and feeding practices and subsequent reductions in stunting. Additionally, households in comparison sites reported approximately 25 percent higher soy production compared to the intervention households, and on average sold a larger percentage of their soy and groundnut harvests. These agricultural differences suggest that the comparison households may have better opportunities to diversify their diets either with their own production or with purchases made possible due to increased income.

The original design included DID estimation, in addition to the random assignment of GACs to treatment and comparison arms, to control for variables not adequately controlled for by the randomization. These baseline differences in the uncontaminated sample affirm the decision to employ a DID estimation approach with controls for differences in observed variables. Additional fixed effects modeling will be necessary to control for unobserved, time-invariant differences across study groups.

## 6. Household Population

### 6.1 Socio-Demographic Characteristics

Households in the treatment and comparison groups had very similar socio-demographic characteristics overall (Table 6.1). Household composition in terms of the presence of adult males and females (age 18+) was consistent across treatment and comparison groups, with over 80 percent of households reporting both adult male and female members. In the treatment group, 16.5 percent of households had an adult female only compared to 14.8 percent of households in the comparison group. Households with only an adult male were much rarer in both the treatment and comparison group, at 0.7 percent and 0.5 percent respectively. Average household size was also very similar, with almost five members per household, typically including two adults and one child under 3 years of age. Distribution of households into the poverty categories was similar between the two groups with approximately one quarter of the households classified as extremely poor, one quarter poor, and the remaining half of the households considered non-poor in both treatment and comparison sites. Approximately 60 percent of the treatment group was from Lilongwe while the comparison group was more evenly divided between the two districts.

**Table 6.1. Households by size, type, and select characteristics**

Characteristics	Treatment	Comparison
<b>Gendered household type</b>		
Adult male and female	82.9	84.8
Adult female only	16.5	14.8
Adult male only	0.7	0.5
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Household size</b>		
Average household size	4.9	4.8
Average number of adults age 18-64	2.0	2.0
Average number of elderly age 65 and older	0.0	0.0
Average number of children under age 3	1.1	1.1
Average number of children under age 2	0.7	0.8
<b>Poverty categories</b>		
Extremely Poor (<180.65 MWK/day)	22.4	26.4
Poor (180.65-291.18 MWK/day)	26.2	25.0
Non-poor (≥291.19 MWK/day)	51.5	48.6
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>District</b>		
Lilongwe	60.7	46.2
Mchinji	39.3	53.8
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of households</b>	<b>1,715</b>	<b>1,840</b>

While the majority of households had a male and female adult, when asked about the head-of-household, the decisionmaking lead was close to evenly distributed between the sexes (Table 6.2). This finding should be interpreted with caution as it is likely that the identification of the “primary respondent” and the “head-of-household” was conflated by the interviewer. In both groups, approximately half of household-heads were between 20-29 years old (49.7 percent in the treatment group and 51.8 percent in the comparison group), while less than 5 percent of household heads were under 20 years of age or over 50 years of age. Literacy was similar in both groups with one-quarter reporting the inability to read or write and two-thirds reporting the ability to read and write. The vast majority of household heads in both the treatment (82.1 percent) and comparison groups (81.4 percent) reported eight years of education or less. Farming was by far the most common occupation in both treatment and comparison groups, with over three quarters of household-heads engaged as farmers.

**Table 6.2. Socio-demographic characteristics of head-of-household**

Characteristics	Treatment	Comparison
<b>Sex</b>		
Male	54.1	53.7
Female	45.9	46.3
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Age</b>		
15-19 years	2.9	3.2
20-29 years	49.7	51.8
30-39 years	33.5	32.6
40-49 years	11.2	8.7
50 and older	2.7	3.8
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Literacy</b>		
Cannot read and write	24.5	26.5
Can sign (write) only	5.4	5.1
Can read only	1.3	1.5
Can read and write	68.8	66.7
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Highest grade of education completed</b>		
No formal schooling	11.8	13.5
Standard 1-4	28.8	27.2
Standard 5-8	41.4	40.7
Secondary 1-2	9.4	8.3
Secondary 3-4	7.8	8.2
University or above	0.0	0.3
Technical or vocational	0.2	0.7
Adult literacy	0.3	0.1
<b>Total</b>	<b>100.0</b>	<b>100.0</b>

**Table 6.2. Socio-demographic characteristics of head-of-household (continued)**

Characteristics	Treatment	Comparison
<b>Occupation</b>		
Farmer	79.8	78.3
School Teaching	0.2	0.6
Artisan/Blacksmith	0.5	1.7
Civil servant	1.0	1.7
Trader/Shopkeeper	1.2	0.7
Seasonal/Permanent agricultural laborer	1.4	1.5
Seasonal/Permanent non-agricultural laborer	3.4	4.0
Family labor/Housework	0.6	1.0
Student	0.0	0.1
Retired	0.3	0.1
Military/Police	0.0	0.6
Petty trading/selling	4.6	4.0
Brick-making	0.6	0.5
Charcoal/firewood selling	0.2	0.2
Other paid employment	2.5	1.7
Other	3.6	3.3
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of households</b>	<b>1,715</b>	<b>1,840</b>

DK/Refused/Missing responses less than 1 percent are not reported.

## 6.2 Living Conditions

Over 80 percent of respondents reported owning or purchasing their own homes, although 7.4 percent of the comparison households were renting compared to only 1.3 percent among the treatment group (Table 6.3). Over three quarters of the respondents from both groups lived in houses with grass-thatched roofs and compacted earth floors, while exterior walls were most often either fired or unfired brick. The modal number of sleeping rooms was two. Very few households, 0.6 percent in the treatment group and 2.3 percent in the comparison group, had working electricity. Over 75 percent of respondents reported batteries as the most commonly used source of lighting, although respondents from comparison sites more frequently cited firewood as their lighting source (Appendix B,  $p=0.00$ ). Cell phones were less common than expected, owned by 32.5 percent of households in the treatment group and 34.9 percent in the comparison group, with on average just over one working cell phone per household.

**Table 6.3. Dwelling characteristics**

Characteristics	Treatment	Comparison
<b>Home ownership</b>		
Own or being purchased	88.7	82.4
Employer provides	0.5	0.5
Free, authorized and unauthorized	9.5	9.6
Rented	1.3	7.4
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Type of roof</b>		
Grass thatched	78.7	76.1
Iron Sheets	21.1	23.7
Other	0.2	0.2
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Type of exterior walls</b>		
Mud/Compacted Earth	13.8	14.5
Unfired Bricks	42.0	37.8
Fired Bricks	42.8	46.0
Other	1.5	1.7
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Type of floor</b>		
Sand/Compacted Earth	92.0	88.4
Smoothed Cement	8.0	11.6
Other	0.0	0.0
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of separate rooms for sleeping</b>		
0	1.0	1.1
1	33.4	33.9
2	41.7	39.6
3	17.7	19.0
4 or more	6.0	6.4
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Utilities</b>		
Working electricity	0.6	2.3
Working landline telephone	0.4	0.2
Working cell phones	32.5	34.9
Number of working cell phones (mean)	1.3	1.3
<b>Main source of lighting</b>		
Battery/Dry cell	78.4	76.8
Firewood	9.5	13.7
Paraffin	0.2	0.6
Electricity	0.7	1.6
Gas	0.0	0.2
Candles	4.4	3.8
Grass	2.2	0.8
Other	4.7	2.4
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of households</b>	<b>1,714</b>	<b>1,839</b>

DK/Refused/Missing responses less than 1 percent are not reported.

About 60 percent of the households visited had a kitchen that was separate from the primary dwelling and one-third reported cooking completely outdoors (Table 6.4). Three-stone fires with firewood were almost exclusively used for cooking in both groups.

**Table 6.4. Household cooking conditions**

Characteristics	Treatment	Comparison
<b>Main cooking location</b>		
Kitchen separate from primary dwelling	59.4	61.5
Kitchen located in primary dwelling	1.1	2.1
Room in primary dwelling	0.4	0.4
Veranda or khonde	2.4	3.1
Fully outdoors	36.5	32.7
Other	0.1	0.1
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Type of cooking stove</b>		
Three stone fire	97.8	96.6
Improved wood stove (fixed/portable)	1.3	1.5
Charcoal	0.9	1.9
Other	0.0	0.0
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Main source of cooking fuel</b>		
Firewood	93.8	94.1
Charcoal	1.1	2.0
Other	5.1	3.9
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of households</b>	<b>1,714</b>	<b>1,839</b>

DK/Refused/Missing responses less than 1 percent are not reported.

Boreholes were the most common source of drinking water used by 79.4 percent of treatment group households and 84.3 percent of households in the comparison group (Table 6.5). However, a substantial percentage of households, 13.8 percent and 11.0 percent in the treatment and comparison groups, respectively, used non-improved sources for drinking water. The vast majority of households, 79.8 percent in the treatment group and 82.1 percent in the comparison group, did not treat their drinking water, which is not surprising given the heavy reliance on boreholes. Those that did treat their water were most likely to add bleach to it.

Very few households had an improved toilet facility; 0.8 percent of households in the treatment group and 0.4 percent of households in the comparison group reported either a flush toilet or a ventilated improved pit latrine. Over 80 percent in both groups reported using pit latrines, while a substantial percentage of households had no toilet facilities, 16.8 percent and 14.3 percent among the treatment and comparison groups, respectively. Half of the households in both groups reported sole use of their toilet facility, with the other half either sharing their or someone else's facility.

**Table 6.5. Water, sanitation, and environment**

Characteristics	Treatment	Comparison
<b>Main source of drinking water</b>		
<b>Improved source</b>		
Piped into dwelling/yard	0.3	0.1
Public standpipe	0.0	0.2
Protected well/springs	6.5	4.3
Borehole	79.4	84.3
<b>Non-improved source</b>		
Unprotected well/springs	10.6	8.1
Surface water	3.2	2.9
Tanker truck/vendor	0.0	0.0
Other	0.1	0.1
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Household treatment of drinking water</b>		
Boil	3.3	3.0
Add bleach/chlorine	16.1	13.3
Other treatment	0.8	1.5
No treatment	79.8	82.1
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Toilet facility</b>		
<b>Improved facility</b>		
Flush toilet	0.3	0.1
Ventilated Improved pit latrine	0.5	0.3
<b>Non-improved facility</b>		
Traditional pit latrine with roof	52.1	54.3
Traditional pit latrine with no roof	29.8	30.9
No toilet facility	16.8	14.3
Other	0.6	0.2
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Toilet use</b>		
For household members only	47.6	51.0
Other households use toilet of this household	28.6	27.2
Household uses toilet of another household	21.5	20.4
Don't know/Missing	2.2	1.4
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Mosquito net use</b>		
<b>During the season when mosquitos are present, who sleeps under the net</b>		
All children under 3	69.6	66.9
Some children under 3	2.0	1.7
No children under 3	0.2	0.2
Household never used a net	27.5	30.5
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of households</b>	<b>1,714</b>	<b>1,839</b>

DK/Refused/Missing responses less than 1 percent are not reported.

Two-thirds of the households reported routine use of mosquito nets during the mosquito season for their children under 3 years of age, although a substantial proportion of households reported never using nets, 27.5 percent and 30.5 percent in the treatment and comparison groups, respectively.

## 6.3 Household Assets

Household asset ownership was similar between the treatment and comparison groups for most items (Table 6.6). Bicycles and radios were the most commonly owned assets; approximately half of all households owned a bicycle and about 40 percent reported radio ownership. Motorcycles and cars were the least commonly owned assets, with 2.8 percent of households in the treatment group and 0.9 percent in the comparison group owning these assets. Households in the treatment group were significantly more likely to report a motorcycle or car ( $p=0.00$ ) and solar panels ( $p=0.00$ ) compared to the comparison group (see Appendix B). However, ownership of solar panels is low in both study groups.

**Table 6.6. Household durable goods**

Durable good	Treatment	Comparison
Bed	13.3	14.1
Table	22.1	21.6
Chair	25.7	27.4
Upholstered Chair	3.2	3.2
Cupboard	2.0	2.1
Mortar and Pestle	22.2	22.3
Iron	7.6	8.5
Radio	38.4	40.3
Television	2.2	4.2
Bicycle	51.0	48.5
Motorcycle or Car	2.8	0.9
Solar Panel	5.3	3.2
<b>Number of households</b>	<b>1,714</b>	<b>1,839</b>

DK/Refused/Missing responses less than 1 percent are not reported.

## 6.4 Household Food Security

A substantial percentage of households experienced moderate or severe hunger within the past 30 days, with a significantly larger proportion reporting hunger in the treatment versus comparison groups ( $p=0.01$ ), 31.4 percent and 27.0 percent respectively (Table 6.7 and Appendix B).

Over one-third of both groups reported sometimes having no food in the house due to lack of resources. The proportion of households that reported members going to sleep hungry because of insufficient food was 33.9 percent in the treatment group versus 28.9 percent in the comparison group. The proportion of households reporting household members going a full

24 hours without food was 22.8 percent in the treatment group versus 17.9 percent in the comparison group.

**Table 6.7. Household food security**

<b>Food security in past 30 days</b>	<b>Treatment</b>	<b>Comparison</b>
Prevalence of households with moderate or severe hunger	31.4	27.0
<b>How often there was no food in house due to lack of resources</b>		
Never	60.8	63.9
Rarely or Sometimes	37.1	34.4
Often	2.1	1.7
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>How often a household member went to sleep hungry due to lack of food</b>		
Never	66.0	71.0
Rarely or Sometimes	32.9	27.9
Often	1.1	1.1
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>How often a household member went a whole day and night without eating due to lack of food</b>		
Never	77.1	82.0
Rarely or Sometimes	21.3	16.6
Often	1.7	1.4
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of households</b>	<b>1,713</b>	<b>1,837</b>

DK/Refused/Missing responses less than 1 percent are not reported.

## 6.5 Social Safety Net Programs

Food- and agriculture-related assistance were the most common social safety net programs, with fertilizer and seed vouchers or coupons by far the most cited benefit, particularly among treatment households (48.9 percent) and comparison households (41.4 percent) as shown in Table 6.8. Participation in nutrition programs, specifically targeting children, mothers, and malnourished children was 7.6 percent among treatment households and 6.2 percent among comparison households. Participation in education-related social assistance programs is rare; less than 1 percent of households participated in any education-related social assistance program. Participation in other social assistance programs is uncommon, although 9.1 percent of households in the treatment group and 6.4 percent of households in the comparison group do participate in community-based childcare programs. Notably, 2.6 percent of the comparison households reported participating in a cash transfer program compared to 1.7 percent among the treatment households.

**Table 6.8. Household participation in social safety net programs**

Assistance received in last 12 months	Treatment	Comparison
<b>Food</b>		
Vouchers or coupons to buy fertilizers or seeds	48.9	41.4
Free seed (for agriculture production)	10.5	10.2
Food/Cash-for-work program	10.5	8.2
Free maize	7.0	7.4
Free food (other than maize)	5.0	6.5
Free distribution of infant cereal (likuni phala)	4.5	3.9
Supplementary feeding for malnourished children at nutritional rehabilitation unit	3.1	2.3
Inputs-for-work program	2.9	3.0
School feeding program	2.5	3.5
<b>Education</b>		
Tertiary education loan scheme	0.2	0.2
Scholarships/bursaries for secondary education	0.1	0.5
Scholarships for tertiary education (university scholarship, upgrading teachers)	0.1	0.3
<b>Cash transfers/other</b>		
Community based childcare	9.1	6.4
Malawi Social Cash Transfer Program	0.9	1.5
Direct cash transfers from other organizations (NGOs, development partners)	0.8	1.1
Other	0.7	0.3
<b>Number of households</b>	<b>1,712</b>	<b>1,838</b>

DK/Refused/Missing responses less than 1 percent are not reported.

## 7. Household Consumption Expenditures

The study uses a consumption expenditure-based measure of poverty rather than income. The use of consumption expenditure as a measure of poverty reflects how most empirical work has been done in Africa. The construction of this aggregate measure draws heavily from the procedures used by Malawi's National Statistics Office (NSO) for the Integrated Household Surveys (IHS).<sup>14,15</sup> The procedures follow established guidelines in poverty measurement literature,<sup>16,17</sup> and broadly comprises four main components:

- Food;
- Non-food, non-consumer durables;
- Consumer durable goods; and
- Actual or self-estimated rental cost of housing.

The survey collected information using different recall periods, ranging from the past week to the past 12 months. Consequently, a common reference period was adopted and all components of consumption were converted into daily figures. The consumption aggregate is also adjusted for temporal cost of living differences. The data were collected over the period of three months from August 2014 to October 2014 and the temporal adjustment reflects differences in prices associated with the duration of the fieldwork, i.e., Malawi Kwacha (MWK) 100 in August 2014 may not have the same value as in October 2014. Since the survey focused on rural areas of Lilongwe and Mchinji, monthly rural consumer price index (CPI) data from the NSO were used to generate the index. The national price level for August 2014 was used as the base. The consumption aggregate was further adjusted for household composition. This was done by dividing the real daily consumption aggregate by household size to obtain per capita consumption expenditures. Official poverty figures for Malawi are also based on per capita consumption expenditures.

### 7.1 Consumption Expenditures

Mean and median daily per capita expenditures were comparable across study groups (Table 7.1). Daily per capita expenditures for food were 170.70 MWK in the treatment group and 166.54 MWK in the comparison group. Mean total daily per capita expenditures were 333.92 MWK in the treatment group and 326.31 MWK in the comparison group. These figures

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<sup>14</sup> Republic of Malawi, National Statistics Office. Malawi Second Integrated Household Survey, 2004-05. Zomba, Malawi.

<sup>15</sup> Republic of Malawi, National Statistics Office. Third Integrated Household Survey, 2010-2011. Zomba, Malawi.

<sup>16</sup> Deaton A, Zaidi S. Guidelines for constructing consumption aggregates for welfare analysis. World Bank, Washington, DC (2002).

<sup>17</sup> Haughton J, Khandker SR. Handbook on Poverty and Inequality. World Bank, Washington, DC (2009).

were converted into constant USD 2010. (See Appendix C for details on the conversion factor.)

**Table 7.1. Daily per capita expenditures, in 2014 Kwacha and constant 2010 USD**

	Malawi Kwacha (MWK)		2010 USD, constant	
	Treatment	Comparison	Treatment	Comparison
Food*	170.70	166.54	1.04	1.01
Non-food	163.22	159.77	0.99	0.97
Mean, total	333.92	326.31	2.03	1.99
Median, total	269.29	262.21	1.64	1.60
<b>Number of households</b>	<b>1,715</b>	<b>1,839</b>	<b>1,715</b>	<b>1,839</b>

\* Food includes non-alcoholic beverages.

## 7.2 Poverty Lines

Four poverty lines were created; two international poverty lines and two national lines routinely used by the NSO of Malawi. Specifically, the two international poverty lines are the \$1.25-a-day and the \$2-a-day lines. The national poverty lines include the national total poverty line, and the national food poverty line (extreme poverty line). The total national povertyline is a sum of the food poverty line and a non-food poverty line. The national poverty lines were first generated in 2004, and were adjusted in 2011 and 2013 using the CPI. The poverty lines

Box 1. Poverty lines per person per day	
Name	Value (MWK)
\$1.25-a-day	229.10
\$2.00-a-day	366.55
National: Total	291.19
National: Extreme	180.65

presented were also adjusted for inflation between 2013 and 2014. The inflation figure for this period was 23.8 percent.<sup>18</sup> The two international poverty lines were converted into MWK using the measure of purchasing power parity for Malawi for 2005, which is equal to 56.92, and the CPIs for relevant years. The poverty lines for 2014 are presented in Box 1. Appendix D provides details about the procedure used to adjust the national poverty lines for inflation between 2013 and 2014. Appendix E provides information about the procedure used to convert the USD \$1.25 and \$2.00 poverty lines (in 2005 PPP) to 2014 MWK.

Three poverty measures were computed for each poverty line. The poverty headcount index provides the percentage of the population who are poor according to each line of poverty. The headcount is easy to interpret but it does not take into account the gap between the consumption levels of the poor and the poverty line, nor does it account for the distribution of that gap among the poor. The second measure used is the poverty gap index, which measures the extent of the difference between the poverty line and the consumption of households as a proportion of the poverty line (see Table 7.2 footnote). This measure captures changes in

<sup>18</sup> Republic of Malawi, National Statistical Office. Consumer Price Index National 2014. Available at: <http://www.nsomalawi.mw/latest-publications/consumer-price-indices/204-consumer-price-index-national-2014.html>

poverty that the poverty headcount index does not detect. For instance, if consumption of the poor increases without necessarily crossing the poverty line, the headcount will not capture this change, while the poverty gap will. The last measure used is the squared poverty gap index, which averages the squares of the poverty gaps relative to the poverty line. It is also a measure of the severity of poverty, but takes into account the inequality among the poor. It is a simple weighted average of the poverty gaps with the weights being the poverty gaps themselves. In that way, this index puts more weight on observations that are well below the poverty line. If we observe changes in the squared poverty gap index, it will indicate that the inequality among the poor has changed. An example to help with the interpretation is that if there is a transfer from a more poor person to a less poor person that may leave unaffected the headcount and the poverty gap, but it will increase the squared poverty gap index because the poorer person is worse off, and the inequality among the poor has increased.

Table 7.2 summarizes measures of poverty in the treatment and comparison groups, based on the different poverty lines and indicators. These data suggest that regardless of the poverty line used, individuals in the treatment group have slightly lower levels of poverty prevalence, poverty gap, and poverty severity relative to those in the comparison group. The extent of the poverty headcount, gap, and severity directly depends on the size of the poverty line adopted.

**Table 7.2. Poverty headcount, gap, and severity results**

Poverty line	Treatment	Comparison
<b>Poverty headcount<sup>1</sup></b>		
Percent of people living on less than \$1.25 per day	40.5	42.0
Percent of people living on less than \$2 per day	67.1	68.4
Percent of people living below the total national poverty line	53.8	55.2
Percent of people living below the national food poverty line (extreme poverty)	26.7	29.8
<b>Poverty gap<sup>2</sup></b>		
\$1.25 per day	13.5	14.8
\$2 per day	29.1	30.3
National: Total	20.8	22.2
National: Extreme	8.2	9.3
<b>Poverty severity<sup>3</sup></b>		
\$1.25 per day	6.4	7.2
\$2 per day	16.0	17.1
National: Total	10.6	11.5
National: Extreme	3.6	4.1
<b>Number of households</b>	<b>1,715</b>	<b>1,839</b>

<sup>1</sup> The poverty headcount index is the percentage of the population who are poor according to each line of poverty. The total national poverty line is a sum of the food poverty line and a non-food poverty line.

<sup>2</sup> The poverty gap index measures the extent to which individuals on average fall below the poverty line, expressed as a percentage of the poverty line. The difference between per capita consumption and the poverty line is zero for non-poor households.

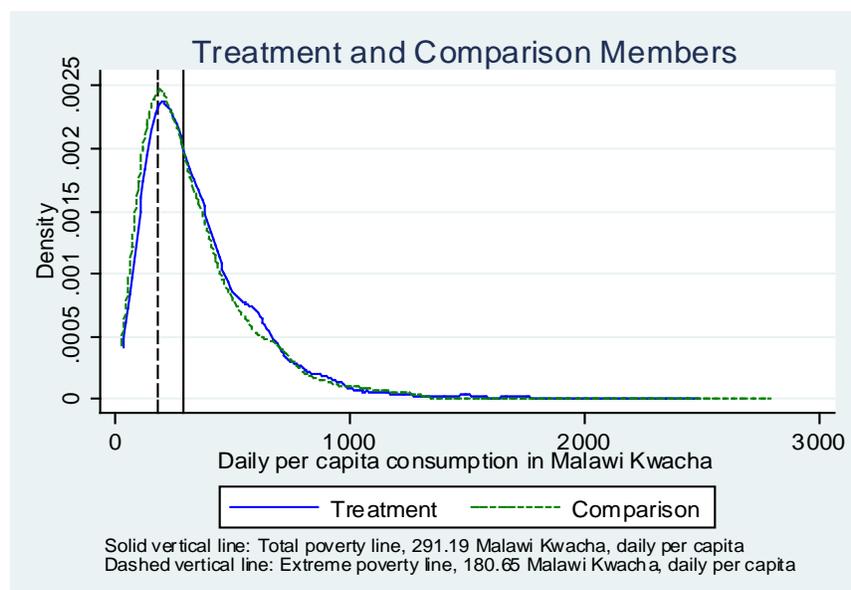
<sup>3</sup> Poverty severity is the squared poverty gap index, which is just the population average of the square of the poverty gaps.

The measured differences in poverty between individuals in the treatment and comparison groups also follow a similar pattern with the differences being directly related to the magnitude of the poverty threshold employed. Although measured poverty is lower among individuals in the treatment group, the only statistically significant difference in the percentage of poor individuals in treatment and comparison groups is for the extreme poverty line. Further, all observed differences across the different poverty lines and measures are quantitatively insubstantial.

These poverty figures are fairly consistent with national figures for Malawi produced by the NSO. For example, when the total poverty line was used, the prevalence of poverty at the national level in 2011 was 50.7 percent, and for Lilongwe and Mchinji the figures were 56.6 percent and 55.5 percent respectively.<sup>19</sup> This suggests that over half of the population was poor. In this evaluation, the prevalence of poverty for individuals in the comparison group was 55.2 percent and 53.8 percent for individuals in the treatment group.

A detailed representation of the distribution of individual consumption in treatment and comparison groups is shown in Figure 7.1. These kernel density plots estimate the empirical distribution of consumption for individuals in treatment and comparison groups. Total and extreme poverty lines are also included. The distribution of consumption is skewed to the right. This shows that while a large share of individuals have very low per capita consumption, the consumption distribution of individuals above the extreme and total poverty lines is spread out over a larger range of values of per capita consumption. This pattern is consistent with other developing countries and reflects that some wealthy households are skewing the distribution.

**Figure 7.1. Distribution of daily per capita consumption**



<sup>19</sup> Republic of Malawi, National Statistics Office. Third Integrated Household Survey, 2010-2011. Zomba, Malawi.

## 7.3 Consumption Expenditure Composition

Daily per capita consumption expenditure was categorized according to the UN statistical classification system called Classification of Individual Consumption According to Purpose. Under this categorization, consumption is subdivided into food and non-food components. The non-food component comprises consumption on housing rent (imputed), per capita utilities and regular maintenance of housing, clothing and footwear, transport, alcohol and tobacco, entertainment, health, personal care and education, and durable goods.

Table 7.3 shows little variation between the percentage shares of each component of per capita expenditure for treatment and comparison groups. In line with many developing countries, food expenditures comprised the largest share of total daily expenditure per capita, at 46.9 percent and 46.8 percent in treatment and comparison groups, respectively. Aside from food, the largest share of expenditures were for housing and utilities, comprising 22.8 percent of daily per capita expenditures in the treatment group and 23.1 percent of per capita expenditures in the comparison group. Combined, food and housing make up about 70 percent of total per capita expenditures.

**Table 7.3. Percent of daily expenditure per capita by expense type, average values**

Expense type	Treatment	Comparison
Food*	46.9	46.8
Housing and utilities	22.8	23.1
Furnishing	5.9	5.6
Clothing	5.2	5.1
Transport	4.6	4.5
Miscellaneous	4.0	4.5
Alcohol and Cigarettes	3.8	3.3
Recreation	2.7	2.9
Communication	1.6	1.8
Health	1.5	1.4
Education	0.5	0.6
<b>Number of households</b>	<b>1,715</b>	<b>1,839</b>

\* Food includes non-alcoholic beverages.

## 8. Farming

### 8.1 Household Cultivation

Households surveyed almost universally owned or cultivated land in the last rainy season with those households in the treatment group owning or cultivating a slightly greater number of plots (Appendix B,  $p=0.00$ ). As seen in Table 8.1, the mean number of plots owned or cultivated was 2.53 in the treatment group and 2.12 in the comparison group, averaging 1.03 and 0.87 hectares, respectively. The majority of plots cultivated were owned and farmed by study households.

**Table 8.1. Household plot use and tenure**

	Treatment	Comparison
<b>Household owned or cultivated land in past rainy season</b>		
Yes	94.7	92.0
No	5.3	8.0
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of households</b>	<b>1,711</b>	<b>1,834</b>
<b>Among those who owned/cultivated land in past rainy season</b>		
<b>Total number of plots owned or cultivated (mean)</b>	<b>2.53</b>	<b>2.12</b>
<b>Total area of plots owned or cultivated (ha)</b>	<b>1.03</b>	<b>0.87</b>
<b>Number of plots cultivated as a kitchen garden (mean)</b>	0.28	0.31
<b>Number of plots by tenure of plot (mean)</b>		
Owned	1.64	1.55
Rented-in	0.36	0.37
Borrowed	0.05	0.04
Communal	0.02	0.00
Other	0.00	0.01
<b>Number of plots by cultivation arrangements past rainy season (mean)</b>		
Farmed by the household	1.95	1.84
Rented-out	0.04	0.04
Sharecropped	0.00	0.00
Lent	0.06	0.07
Not in use	0.01	0.01
Other	0.00	0.01
<b>Number of households that cultivated land</b>	<b>1,620</b>	<b>1,734</b>

DK/Refused/Missing responses less than 1 percent are not reported.

Among farming households, both groups cultivated similar numbers of crops, with about one-third of households cultivating two crops across groups. Maize was the most popular crop, cultivated by 93.7 and 90.5 percent of households, followed by 48.6 percent and 46.5 percent cultivating groundnuts, and 36.0 percent and 33.1 percent cultivating soy, in treatment and comparison groups, respectively (Table 8.2). Tobacco was also cultivated by one fifth of households in the treatment group and one sixth of households in the comparison group.

**Table 8.2. Number and type of crops grown by household**

	Treatment	Comparison
<b>Total number of crops grown</b>		
1 crop	26.5	28.4
2 crops	33.2	36.2
3 crops	23.1	21.6
4-5 crops	15.3	12.8
6-8 crops	1.8	1.0
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Cultivation by crop</b>		
Maize	93.7	90.5
Groundnuts	48.6	46.5
Soy	36.0	33.1
Tobacco	20.5	15.4
Beans	10.1	7.1
Orange-Flesh Sweet Potatoes	6.6	5.9
White Sweet Potatoes	4.4	4.0
<b>Number of households that cultivated land</b>	<b>1,620</b>	<b>1,734</b>

DK/Refused/Missing responses less than 1 percent are not reported.

Table 8.3 provides household cultivation characteristics for groundnuts, soy, maize, and tobacco. Variation existed across the different crop types and also across treatment and comparison groups. Households in the treatment and comparison groups cultivated similar size plots in terms of hectares (ha) within each crop. Households in both treatment and comparison groups dedicated an average of 0.3 hectares of land to farming groundnuts. On average a larger percentage of the groundnut harvest was sold by the comparison group (Appendix B,  $p=0.00$ ). Notably, the mean value per kilograms for groundnut sales in the treatment group was lower than the comparison group, at 84.00 MWK/kg (or 0.23 USD/kg) and 103.44 MWK/kg (or 0.28 USD/kg), respectively (Appendix B,  $p=0.02$ ).

Soy was cultivated on an average of 0.3 hectares of land in both groups. Households in the treatment group harvested less soy ( $p=0.00$ ), had lower land productivity ( $p=0.00$ ), and sold a smaller percentage of their harvest (kg cultivated per hectare,  $p=0.02$ ) than did households in the comparison group (Appendix B).

The majority of households cultivated maize, although a much smaller proportion of households—just under one-third—sold their maize harvest compared with the other crops. The value of the maize harvest was similar across groups, with households receiving an average of 62.28 MWK/kg (or 0.17 USD/kg) and 61.77 MWK/kg (also 0.17 USD/kg) in treatment and comparison groups, respectively.

**Table 8.3. Household cultivation characteristics by crop**

	Groundnuts		Soy		Maize		Tobacco	
	Treatment	Comparison	Treatment	Comparison	Treatment	Comparison	Treatment	Comparison
<b>Area cultivated last season</b> (mean ha)	0.33	0.32	0.25	0.28	0.51	0.51	0.40	0.40
<b>Total harvested last season</b> (mean kg)	318.0	288.6	105.2	132.4	2,011.1	1,908.4	312.3	314.4
<b>Mean land productivity</b> (kg per ha)	1,059.2	996.6	453.6	526.9	3,886.8	3,812.9	769.6	906.3
<b>Percent of households who sold harvest</b>	57.8	50.3	67.6	76.8	28.9	32.7	97.2	97.3
<b>Number of households cultivating</b>	<b>821</b>	<b>863</b>	<b>605</b>	<b>597</b>	<b>1,600</b>	<b>1,715</b>	<b>370</b>	<b>289</b>
<b>Among households that sold harvest</b>								
<b>Amount of harvest sold</b> (mean kg)	209.8	226.6	107.0	122.9	283.4	358.2	306.7	298.8
<b>Percent of harvest sold</b>	55.0	59.1	75.5	78.9	15.0	21.9	99.1	98.5
<b>Mean value of harvest sold</b> (MWK)	15,174.32	15,640.50	14,654.02	15,468.55	13,440.24	14,799.15	132,152.40	129,087.75
<b>Mean value of harvest per kg</b> (MWK/kg)	84.00	103.44	213.49	139.25	62.28	61.77	418.01	437.60
<b>Person who decided how most of the money from crop sales was used as reported by men</b>								
Self	43.4	39.5	43.7	37.5	49.8	37.5	43.2	29.8
Partner/spouse	40.1	47.5	37.8	46.0	43.7	52.0	45.1	57.1
Self and partner/spouse jointly	15.7	11.7	17.2	15.0	6.6	10.6	9.9	13.0
Other household member/jointly	0.0	0.7	0.0	0.0	0.0	0.0	1.8	0.0
Other	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0
Don't know/Missing	0.8	0.6	1.3	0.6	0.0	0.0	0.0	0.0
<b>Total</b>	<b>100.0</b>							
Number of men	103	143	90	117	93	156	90	103
<b>Person who decided how most of the money from crop sales was used as reported by women</b>								
Self	26.5	23.5	22.1	20.6	24.1	24.6	13.7	12.9
Partner/spouse	58.5	57.6	58.3	55.7	62.4	61.2	68.6	62.4
Self and partner/spouse jointly	12.9	16.3	13.9	20.7	11.6	13.5	17.7	23.8
Other household member/jointly	0.2	0.3	0.7	0.8	0.9	0.8	0.0	0.0
Other	0.0	1.0	1.7	1.0	1.1	0.0	0.0	0.0
Don't know/Missing	1.9	1.3	3.2	1.2	0.0	0.0	0.0	0.9
<b>Total</b>	<b>100.0</b>							
Number of women	381	337	352	356	367	430	268	177
<b>Number of households that sold harvest</b>	<b>484</b>	<b>480</b>	<b>442</b>	<b>473</b>	<b>460</b>	<b>586</b>	<b>358</b>	<b>280</b>

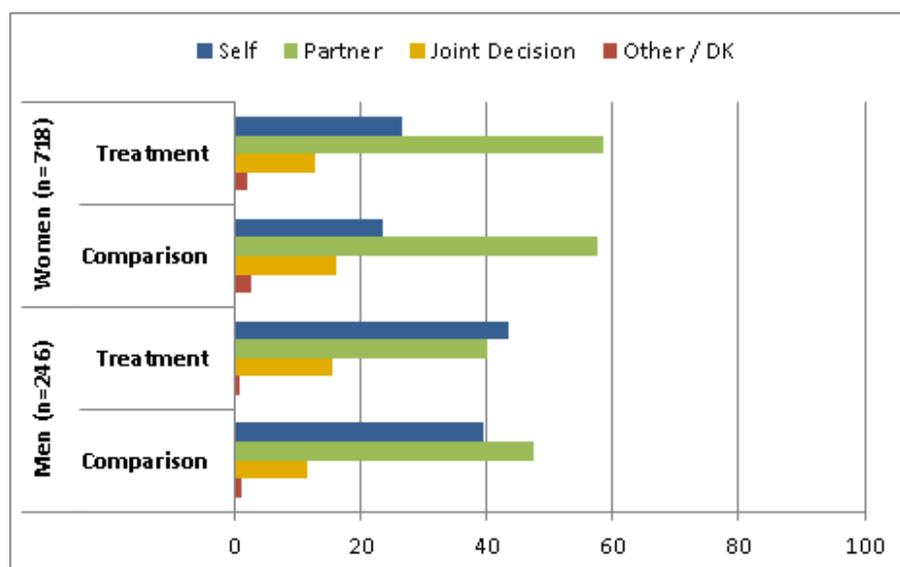
DK/Refused/Missing responses less than 1 percent are not reported.

**NOTE:** Extreme outliers (top/bottom 1 percent) were dropped from mean harvest, mean sold, and mean value of crop sold estimates. This procedure resulted in slightly different household samples for each of these indicators.

Among households cultivating tobacco, an average of 0.4 hectares was used to cultivate the crop in both groups. Similar amounts of tobacco were harvested and sold across groups. Households farming tobacco sold it almost universally, and of those that sold tobacco, they sold almost 100 percent of the harvest. Mean value per kilogram was 418.01 MWK/kg (1.15 USD/kg) in the treatment group and 437.60 MWK/kg (1.20 USD/kg) in the comparison group.

The reported main decisionmaker regarding use of income generated from harvest sales varied by sex of respondent and across groups, yet was fairly consistent by crop (Table 8.3). For men, the percent who reported themselves as the main decisionmaker ranged from 29.8 to 49.8 percent. For women, the percent who reported themselves as the main decisionmaker ranged from 12.9 to 26.5 percent. For both men and women, joint decisionmaking was the norm for less than 20 percent of respondents. Figure 8.1 illustrates the decisionmaking for groundnut income. A similar pattern is seen for soy and maize.

**Figure 8.1. Main decisionmaker for groundnut harvest income**



## 8.2 Farming Assets

Households owned a variety of farming assets including tools and farm animals (Table 8.4). Ownership of these assets was similar in treatment and comparison households. Over 95 percent of households owned a hand hoe in both groups. Other frequently owned tools included a panga knife, watering can, axe, and sickle, in descending order of frequency, ranging from 50.7 percent to 36.8 percent of households. With regard to household animal stock, the largest share of households owned chickens or guinea fowl, 43.0 percent and 49.6 percent of households in the treatment and comparison groups, respectively. Goats or sheep were also owned by about one fourth of households in both treatment and comparison groups.

**Table 8.4. Household farming assets**

Durable good	Treatment	Comparison
<b>Tools</b>		
Hand hoe	95.6	95.6
Panga Knife	50.7	50.4
Watering Can	45.8	42.6
Axe	38.6	37.3
Sickle	36.8	37.2
Ox Cart	5.6	2.8
<b>Animals</b>		
Chickens/Guinea Fowl	43.0	49.6
Goat/Sheep	25.5	23.0
Bull/Ox	4.4	1.9
Cow – local zebu	3.9	2.2
Donkey/Mule/Horse	1.0	0.6
Cow – hybrid	0.5	0.4
<b>Number of households</b>	<b>1,620</b>	<b>1,734</b>

DK/Refused/Missing responses less than 1 percent are not reported.

### 8.3 Farming Education and Resources

Households received a variety of crop-specific agricultural assistance, in the form of information and inputs such as improved seed, over the last twelve months (Table 8.5). Figure 8.2 shows assistance received for groundnuts and soy in four key focus areas for VC work.

The information topic most frequently reported for both soy and groundnuts was nutritional value, followed by groundnut and soy processing, improved seed, advice on aflatoxin (groundnuts only), aggregation and marketing, and becoming a certified seed grower. Between 5-11 percent of respondents reported receiving improved groundnut or soy seeds.

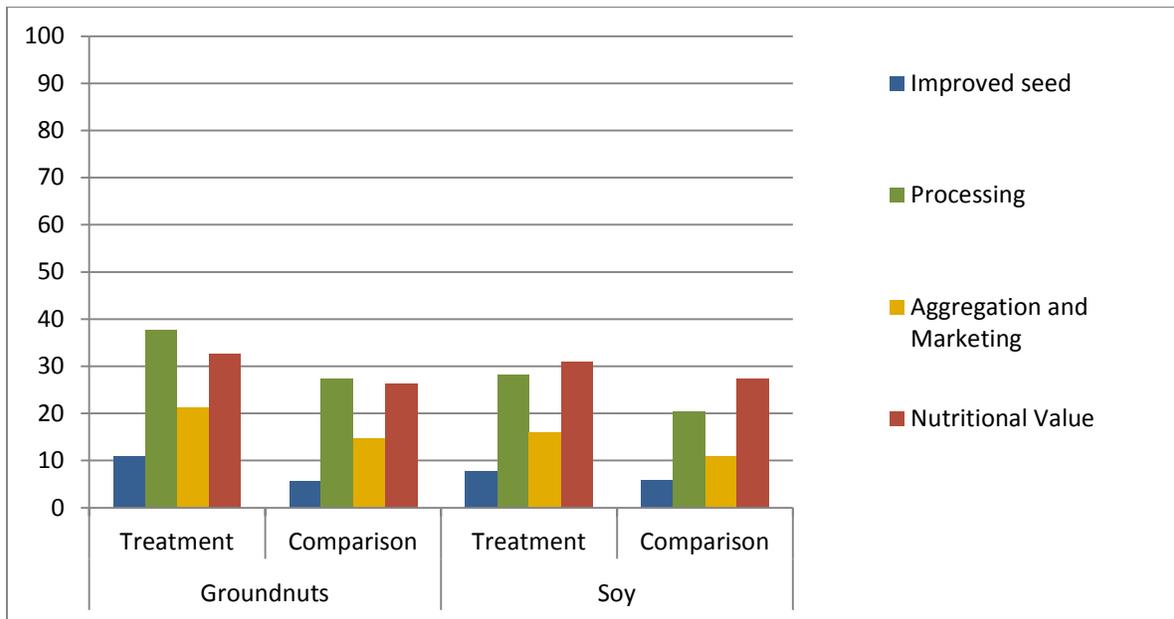
Information and inputs were less frequently reported for orange-flesh sweet potatoes and dairy. Improved seed for orange-flesh sweet potatoes was the most frequently reported input for that crop, at 9.0 percent and 5.7 percent in treatment and comparison groups, respectively. Information on improved feeding for dairy cows was the most common benefit for dairy, at 9.2 percent and 7.7 percent in treatment and comparison groups, respectively. Interestingly, more farmers reported receiving information on dairy feeding practices than actually reported owning a cow.

**Table 8.5. Agricultural information and inputs received in the last 12 months**

Received by household in last 12 months	Treatment	Comparison
<b>Groundnuts</b>		
Information on improved seed	26.1	21.7
Improved seed received (free or purchased)	11.0	5.5
Information on becoming a certified seed grower	18.8	13.8
Information on labor-saving harvest methods	12.1	8.1
Information on aflatoxin	28.1	23.6
Information on processing options (e.g., expel, mill)	37.6	27.2
Information on aggregation and marketing	21.2	14.7
Information on nutritional value	32.7	26.3
<b>Soy</b>		
Information on improved seed	18.7	15.9
Improved seed received (free or purchased)	7.7	5.9
Seed inoculant received (free or purchased)	4.9	3.4
Information on becoming a certified seed grower	15.0	10.0
Information on labor-saving harvest methods	8.8	6.4
Information on processing options (e.g., expel oil, mill)	28.1	20.3
Information on aggregation and marketing	16.0	10.9
Information on nutritional value	30.8	27.2
<b>Orange-flesh sweet potatoes</b>		
Information on improved seed	9.0	5.7
Improved seed received (free or purchased)	3.4	1.7
Information on becoming a certified seed grower	3.5	2.0
Information on labor-saving harvest methods	2.9	1.2
Information on processing options (e.g., mill)	5.8	3.4
Information on aggregation and marketing	3.5	1.5
Information on nutritional value	4.6	3.0
<b>Dairy</b>		
Information on improved feeding for dairy cows	9.2	7.7
Information on improving the dairy stock through hybrid breeding	7.5	5.9
Hybrid bull sperm received (free or purchased)	2.5	2.1
Information on processing options for dairy (e.g., bottle, ferment)	4.8	3.0
Information on aggregation and marketing	5.2	3.0
<b>Number of households</b>	<b>1,677</b>	<b>1,786</b>

DK/Refused/Missing responses less than 1 percent are not reported.

**Figure 8.2. Key technical assistance for groundnuts and soy**



A small percentage of households in both treatment and comparison groups reported currently participating in a farmer’s club (Table 8.6). In the treatment group, 9.8 percent of households reported one participant and an additional 3.0 percent had two participants. Similarly in the comparison group, 8.3 percent and 2.9 percent of households had one and two participants, respectively. Among participating households, over two-thirds of the participants were female.

Current members were then queried about their participation during the last growing season. The majority reported participating in a NASFAM group during the last growing season, with an equal proportion of respondents reporting groundnut and soy clubs. A review of households reporting membership to another farmer’s association or union found that most of the respondents only knew their club by local village name rather than by association or union (i.e., FUM or NASFAM).

**Table 8.6. Household participation in a farmer's club**

	Treatment	Comparison
<b>Number of households currently participating in at least one farmer's club</b>		
No members	87.2	88.8
1 member	9.8	8.3
2 members	3.0	2.9
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of households</b>	<b>1,677</b>	<b>1,786</b>
<b>Among participating households, sex of active members</b>		
Male only	26.8	28.6
Female only	50.0	45.7
Male and Female	23.1	25.7
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of participating households</b>	<b>208</b>	<b>219</b>
<b>Among participating households who were active in the last growing season</b>		
<b>Farmer's Association or Union*</b>		
FUM	5.6	8.5
NASFAM	58.8	51.9
Other	35.8	43.9
Don't know	4.2	1.3
<b>Crop-specific farmer's club*</b>		
Groundnuts	46.4	46.8
Soy	46.8	56.1
Orange-flesh Sweet Potatoes	3.5	3.5
Dairy	9.6	8.9
Other <sup>1</sup>	44.1	51.8
<b>Number of participating households active last season</b>	<b>154</b>	<b>172</b>

DK/Refused/Missing responses less than 1 percent are not reported.

\* Multiple responses possible, percentages will not sum to 100 percent.

<sup>1</sup> Other crop-specific farmer's club groups included clubs for maize, tobacco, cassava, potatoes, sunflowers, chickens, paprika, vegetables, bee-keeping, and fish.

Among the small subset of households participating in a farmer's club for groundnuts or soy, the majority reported participating for less than one year (Table 8.7). Most households met 3-5 times with the groundnut farmer's club in the past 12 months (Figure 8.3).

The largest share of soy farmer's clubs met 3-5 times in the past 12 months in both treatment and comparison groups (Figure 8.4).

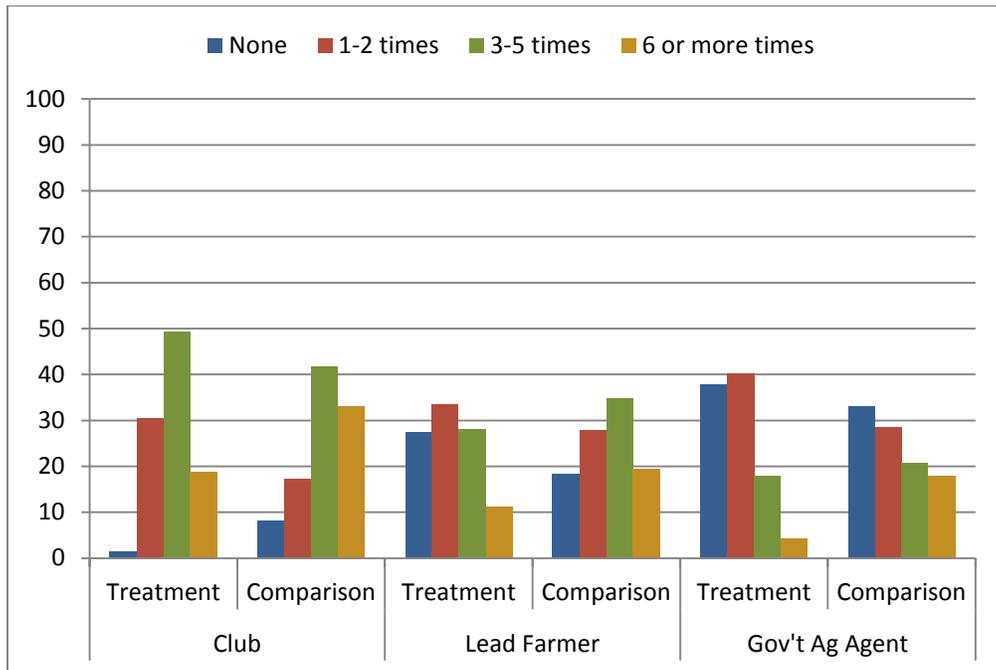
**Table 8.7. Household farmer's club participation by crop<sup>1</sup>**

	Groundnuts		Soy	
	Treatment	Comparison	Treatment	Comparison
<b>Number of years someone in household participated</b>				
< 1 year	64.7	64.1	80.2	67.6
1-2 years	18.2	16.9	12.3	20.3
3 or more years	17.1	19.0	7.5	12.2
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of times member met with club in past 12 months</b>				
Did not meet with club	1.5	8.1	1.6	5.0
1-2 times	30.4	17.3	31.1	22.9
3-5 times	49.3	41.6	42.2	46.1
6 or more times	18.8	33.1	25.1	26.0
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of times member met with lead farmer in past 12 months</b>				
Did not meet with lead farmer	27.4	18.2	20.0	15.9
1-2 times	33.4	27.8	42.3	39.6
3-5 times	28.0	34.7	20.6	28.7
6 or more times	11.2	19.3	17.1	15.8
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of times member met with government agriculture agent in past 12 months</b>				
Did not meet with agent	37.8	33.0	28.7	33.0
1-2 times	40.2	28.5	44.4	34.9
3-5 times	17.8	20.7	16.1	18.9
6 or more times	4.3	17.8	10.7	13.3
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of participating households</b>	<b>72</b>	<b>82</b>	<b>71</b>	<b>85</b>

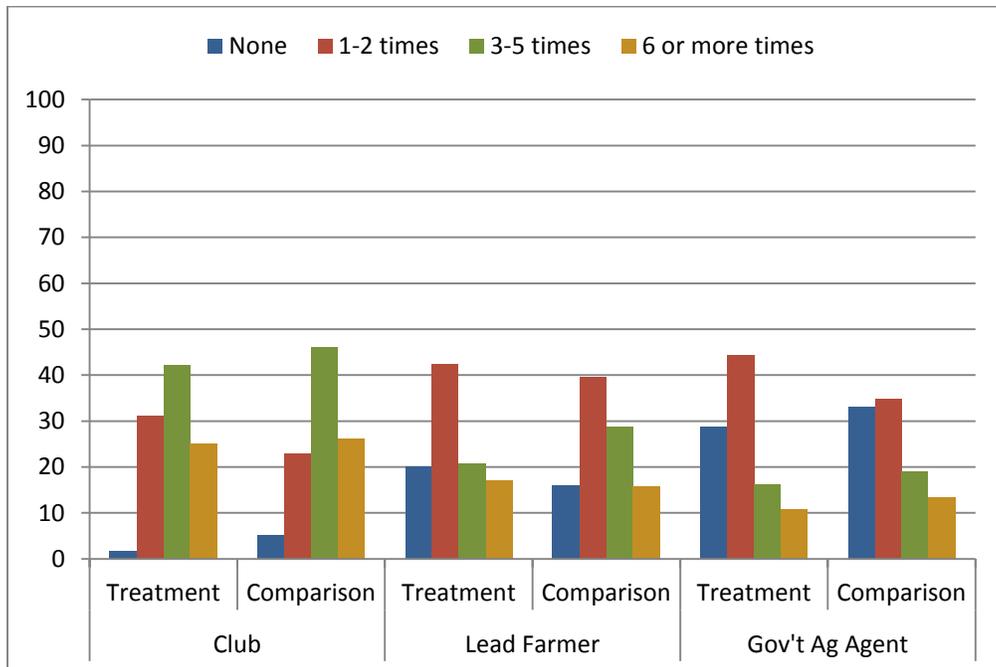
DK/Refused/Missing responses less than 1 percent are not reported.

<sup>1</sup> Includes households who reported participation in either groundnut or soy farmer's group; only 14 households reported participation in orange-flesh sweet potato farmer's group (data not shown).

**Figure 8.3. Frequency of meetings with groundnut clubs, leaders, agents in last 12 months**



**Figure 8.4. Frequency of meetings with soy clubs, leaders, agents in last 12 months**



## 9. Child Nutrition and Health

### 9.1 Child Characteristics

Table 9.1 shows similar sex and age distributions for children under 3 years of age across treatment and comparison groups. Distribution by district across groups, however, was not similar at baseline. In the treatment group, 60.5 percent of children under 3 were located in Lilongwe and 39.5 percent were located in Mchinji, whereas in the comparison group 45.2 percent of children were in Lilongwe and 54.8 percent in Mchinji.

**Table 9.1. Characteristics for children under 3 years of age**

Characteristics	Treatment	Comparison
<b>Age in months</b>		
< 6	15.0	15.2
6-11	17.2	18.3
12-17	15.8	16.9
18-23	20.3	18.3
24-35	31.6	31.3
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Sex</b>		
Male	50.3	49.1
Female	49.8	50.9
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>District</b>		
Lilongwe	60.5	45.2
Mchinji	39.5	54.8
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of children under 3</b>	<b>1,832</b>	<b>1,976</b>

DK/Refused/Missing responses less than 1 percent are not reported.

### 9.2 Child Nutrition

Exclusive breastfeeding measures the percent of children under 6 months old who were exclusively breastfed during the day preceding the survey. By definition, this includes infants who received milk expressed (or from a wet nurse). The infants may also have received oral rehydration salts (ORS), vitamins, minerals and/or other medicines but did not receive any food or liquid, including water.<sup>20</sup>

The prevalence of exclusive breastfeeding among infants under 6 months old was 64.3 percent in the treatment group and 67.8 percent in the comparison group (Table 9.2).

<sup>20</sup> USAID. Feed the Future Handbook of Indicator Definitions (October 2014).

Available at: <http://feedthefuture.gov/resource/feed-future-handbook-indicator-definitions>

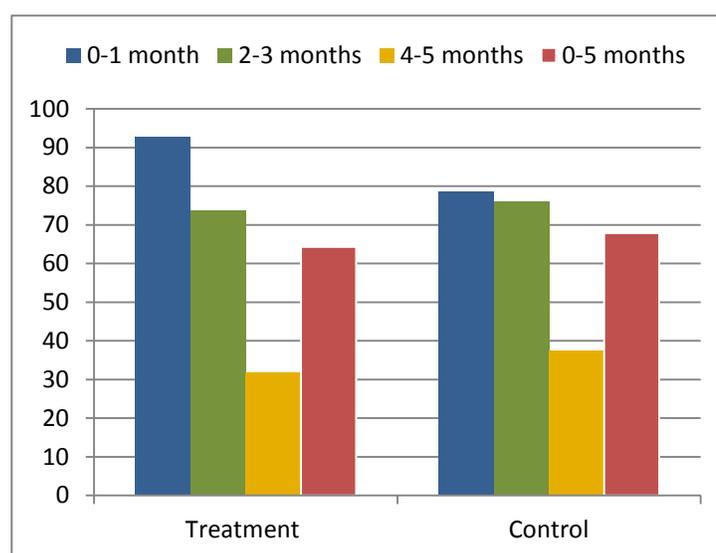
**Table 9.2. Prevalence of exclusive breastfeeding of children under 6 months of age**

Characteristics	Treatment	n	Comparison	n
<b>Prevalence of exclusive breastfeeding of children under 6 months of age</b>	64.3	272	67.8	303
<b>Age in months</b>				
0-1 month	92.7	88	78.7	119
2-3 months	73.6	83	75.9	101
4-5 months	31.8	101	37.4	83
<b>Sex</b>				
Male	64.8	143	69.3	156
Female	63.8	129	66.2	147
<b>District</b>				
Lilongwe	64.9	184	61.1	171
Mchinji	63.4	88	73.5	132

DK/Refused/Missing responses less than 1 percent are not reported.

These results are comparable to those found in the 2010 MDHS, where 68.2 percent of infants under 6 months old were exclusively breastfed.<sup>21</sup> Among the 0-1 month age group, 92.7 percent and 78.7 percent of infants were breastfed exclusively in the treatment and comparison groups, respectively, and rates for 2-3 month-olds were no different (Figure 9.1). Most concerning is that by 4-5 months of age, only 31.8 percent of infants in treatment sites and 37.4 percent in comparison sites continued to be exclusively breastfed.

**Figure 9.1. Exclusive breastfeeding by age**



Breastfeeding rates for infants from the comparison group in Mchinji were 73.5 percent in the comparison group and 63.4 percent in the treatment group; while rates in Lilongwe were more similar across comparison (61.1%) and treatment (64.9%) groups.

Feed the Future uses the measure of minimum acceptable diet (MAD) developed by the World Health Organization (WHO)<sup>22</sup> that measures the proportion of children ages 6-23 months who received a MAD apart from breastmilk. To achieve a MAD, children must meet minimum meal

<sup>21</sup> Republic of Malawi, National Statistical Office and ICF Macro, 2011. Malawi Demographic and Health Survey 2010. Zomba, Malawi, and Calverton, Maryland, USA.

<sup>22</sup> WHO, 2010. Indicators for assessing infant and young child feeding practices, part 2 measurement. Geneva, Switzerland.

frequency and minimum dietary diversity thresholds in the day prior to the survey. Requirements for meal frequency and dietary diversity vary by breastfeeding status.<sup>23</sup>

The prevalence of children 6-23 months receiving a MAD was 13.4 percent in the treatment group, with 2.3 mean number of meals and 2.8 mean number of food groups consumed in the past day (Table 9.3). Among children 6-23 months of age in the comparison group, 10.4 percent met MAD requirements, the mean meal frequency was 2.1 meals and the mean number of food groups consumed was 2.7.

**Table 9.3. Prevalence of children 6-23 months receiving a minimum acceptable diet**

	Treatment				Comparison			
	Mean meal frequency	Mean number of food groups	MAD <sup>1</sup>	n	Mean meal frequency	Mean number of food groups	MAD <sup>1</sup>	n
<b>Children 6-23 months of age</b>	2.3	2.8	13.4	962	2.1	2.7	10.4	1,003
<b>Age in months</b>								
6-8	2.2	2.5	21.6	156	1.9	1.9	5.4	189
9-11	2.3	2.6	7.7	162	2.1	2.8	13.8	160
12-17	2.3	2.9	14.9	274	2.3	2.8	12.2	312
18-23	2.3	2.9	11.1	370	2.2	2.9	10.0	342
<b>Sex</b>								
Male	2.1	2.7	12.7	466	2.1	2.6	11.2	483
Female	2.4	2.9	14.1	496	2.2	2.7	9.6	520
<b>Breastfeeding status</b>								
Breastfed	2.2	2.8	14.3	872	2.1	2.7	11.5	911
Not currently breastfed	2.6	3.1	3.2	90	2.1	2.7	0.0	92
<b>District</b>								
Lilongwe	2.3	2.8	13.2	622	2.1	2.7	9.7	580
Mchinji	2.2	2.7	13.7	340	2.2	2.7	10.9	423

DK/Refused/Missing responses less than 1 percent are not reported.

<sup>1</sup> Percent of children who met the minimum acceptable diet as defined by Feed the Future presented.

Children in the treatment group generally had the same or slightly greater mean meal frequency and dietary diversity compared to children in the comparison group across gender, age, breastfed status, and district. Prevalence of children receiving a MAD among subgroups of interest varied within subgroup and across treatment and comparison groups. The greatest prevalence of children receiving a MAD was for children aged 6-8 months in the treatment group (21.6 percent) and the lowest prevalence of children receiving a MAD was among non-breastfed children in the comparison group (0.0 percent). This low prevalence of MAD among non-breastfed children was primarily due to low milk intake in this group. Estimates for MAD in

<sup>23</sup> USAID. Feed the Future Handbook of Indicator Definitions (October 2014). Available at: <http://feedthefuture.gov/resource/feed-future-handbook-indicator-definitions>.

our sample are lower than estimates for MAD from the 2010 DHS, which report 18.1 percent of children 6-23 months receiving a MAD.<sup>24</sup>

Stunting, or height-for-age, is a reflection of chronic under-nutrition.<sup>25</sup> Stunting measures the percent of children who have a height-for-age Z-score less than minus two standard deviations (<-2SD) from the standard height-for-age, as defined by WHO Growth Standards.<sup>26</sup> Table 9.4 shows the prevalence of severe stunting (<-3SD from the standard height-for-age), combined moderate and severe stunting (<-2SD from the standard height-for-age), and mean height-for-age Z-scores, by treatment and comparison group. Percentages reflect the prevalence of stunted children within each specific subgroup and study group (e.g., treatment or comparison).

The prevalence of moderately and severely stunted children under 3 years of age is similar across the two study populations (Figure 9.2). Both groups have rates of stunting exceeding 40 percent at baseline. The data suggest that stunting is more prevalent among males and increases with age.

**Table 9.4. Prevalence of stunted children under 3 years of age**

	Height-for-age Z-score – treatment				Height-for-age Z-score – comparison			
	% Below -3 SD	% Below -2 SD	Mean Z-score	n	% Below -3 SD	% Below -2 SD	Mean Z-score	n
<b>Children under 2</b>	14.4	38.8	-1.65	1,249	10.5	35.8	-1.53	1,330
<b>Children under 3</b>	16.4	43.8	-1.81	1,828	13.6	41.6	-1.74	1,966
<b>Age in months</b>								
< 6	10.9	24.6	-1.23	275	4.3	20.5	-1.04	303
6-11	11.2	32.2	-1.50	324	5.9	28.3	-1.33	357
12-17	17.4	45.7	-1.83	277	11.5	44.3	-1.76	320
18-23	17.5	49.4	-1.95	373	19.5	47.8	-1.93	350
24-35	20.6	54.5	-2.16	579	20.5	54.3	-2.19	636
<b>Sex</b>								
Male	18.1	46.3	-1.87	913	18.1	46.0	-1.89	967
Female	14.7	41.3	-1.76	915	9.4	37.3	-1.60	999
<b>District</b>								
Lilongwe	14.2	43.1	-1.76	1,188	13.1	38.4	-1.64	1,113
Mchinji	19.7	44.8	-1.89	640	14.2	44.2	-1.82	853

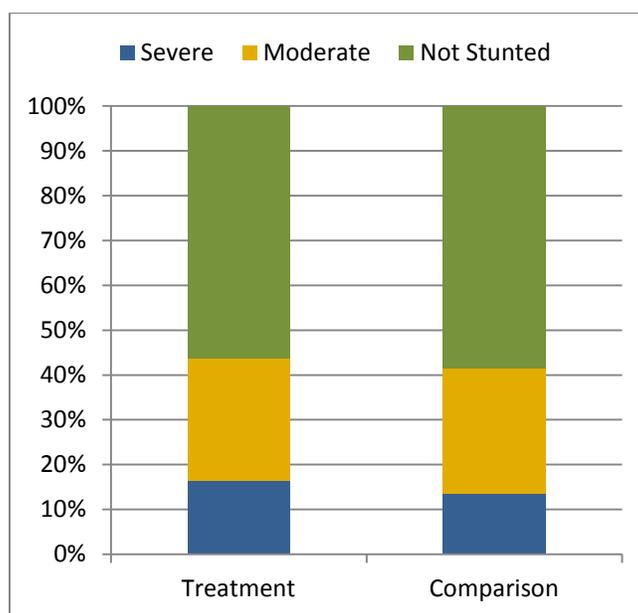
DK/Refused/Missing responses less than 1 percent are not reported.

<sup>24</sup> Republic of Malawi, National Statistical Office and ICF Macro, 2011. Malawi Demographic and Health Survey 2010. Zomba, Malawi, and Calverton, Maryland, USA.

<sup>25</sup> USAID. Feed the Future Handbook of Indicator Definitions (October 2014). Available at: <http://feedthefuture.gov/resource/feed-future-handbook-indicator-definitions>

<sup>26</sup> WHO. Child Growth Standards. Available at: <http://www.who.int/childgrowth/en/>

**Figure 9.2. Prevalence of stunting**



Another measure to track growth over time is absolute change in length. The mean length of children under 2 years old in the sample was similar across the treatment and comparison groups, with an average length of 70.0 centimeters in the treatment group and 69.6 centimeters in the comparison group (about 27.5 inches) (Table 9.5).

**Table 9.5. Mean length (cm) of children under 2 years of age**

	Treatment	n	Comparison	n
<b>Mean length of children under 2</b>	70.0	1,249	69.6	1,330
<b>Age in months</b>				
< 6	57.7	275	57.0	303
6-11	67.5	324	67.7	357
12-17	73.3	277	73.5	320
18-23	78.6	373	78.3	350
<b>Sex</b>				
Male	70.6	617	69.7	652
Female	69.4	632	69.5	678
<b>District</b>				
Lilongwe	70.0	821	69.9	768
Mchinji	69.9	428	69.4	562

DK/Refused/Missing responses less than 1 percent are not reported.

Weight-for-age, or underweight, reflects acute and/or chronic under-nutrition. Table 9.6 shows the prevalence of children who are severely underweight (<-3SD below the standard weight-for-age), the combined prevalence of moderately and severely underweight children (<-2SD from the median standard weight-for-age), and the average weight-for-age Z-score, by treatment and comparison group. Percentages reflect the prevalence of underweight within each specific subgroup and study group (e.g., treatment or comparison).

**Table 9.6. Prevalence of underweight children under 3 years of age**

	Weight-for-age Z-score – treatment				Weight-for-age Z-score – comparison			
	% Below -3 SD	% Below -2 SD	Mean Z- score	n	% Below -3 SD	% Below -2 SD	Mean Z- score	n
<b>Children under 2</b>	3.2	13.0	-0.74	1,250	2.5	11.1	-0.69	1,330
<b>Children under 3</b>	3.4	13.9	-0.83	1,829	2.5	12.9	-0.79	1,966
<b>Age in months</b>								
< 6	2.2	6.7	-0.32	275	1.2	8.8	-0.39	303
6-11	4.5	15.7	-0.78	324	2.6	11.1	-0.71	357
12-17	4.3	14.0	-0.89	277	2.9	14.0	-0.82	320
18-23	1.9	14.5	-0.90	374	3.2	10.7	-0.79	350
24-35	4.0	15.9	-1.03	579	2.3	16.8	-1.03	636
<b>Sex</b>								
Male	3.4	14.7	-0.86	914	3.0	15.0	-0.91	967
Female	3.5	13.0	-0.80	915	2.0	11.0	-0.68	999
<b>District</b>								
Lilongwe	2.9	13.3	-0.78	1,188	2.7	12.4	-0.71	1,113
Mchinji	4.3	14.9	-0.90	641	2.2	13.4	-0.86	853

DK/Refused/Missing responses less than 1 percent not reported.

The prevalence of underweight, both severe and moderate underweight, was substantially lower in the study population compared to the prevalence of stunting. Underweight rates did not increase with age as suggested with stunting. Rather after 6 months of age, 14-16 percent of children were moderately or severely underweight across all ages in the treatment group as shown in Table 9.6. Rates in the comparison group cover a broader range (10-17 percent), yet no strong age gradient is evident.

Weight-for-height, or wasting, is a measure of acute malnutrition. Table 9.7 shows the prevalence of children who are severely malnourished (<-3SD below the standard weight-for-height), the combined prevalence of moderately and severely malnourished (<-2SD from the median standard weight-for-height), and the average weight-for-height Z-score, by treatment and comparison group. Percentages reflect the prevalence of wasting within each specific subgroup and study group (e.g., treatment or comparison).

**Table 9.7. Prevalence of wasted children under 3 years of age**

	Weight-for-height Z-score – treatment				Weight-for-height Z-score – comparison			
	% Below -3 SD	% Below -2 SD	Mean Z-score	n	% Below -3 SD	% Below -2 SD	Mean Z-score	n
<b>Children under 2</b>	0.6	2.8	0.27	1,247	0.2	2.4	0.24	1,328
<b>Children under 3</b>	0.4	2.5	0.26	1,825	0.1	2.1	0.24	1,962
<b>Age in months</b>								
< 6	0.7	2.5	0.91	273	0.0	1.0	0.69	302
6-11	1.6	5.1	0.15	324	0.7	3.2	0.11	357
12-17	0.0	3.0	0.01	277	0.0	3.1	0.03	320
18-23	0.0	1.0	0.11	373	0.0	2.0	0.20	349
24-35	0.1	1.8	0.23	578	0.0	1.4	0.23	634
<b>Sex</b>								
Male	0.3	2.9	0.24	911	0.2	2.6	0.22	966
Female	0.6	2.1	0.27	914	0.1	1.5	0.26	996
<b>District</b>								
Lilongwe	0.4	2.5	0.28	1,185	0.2	2.3	0.28	1,111
Mchinji	0.4	2.5	0.22	640	0.1	1.9	0.21	851

DK/Refused/Missing responses less than 1 percent not reported.

The prevalence of wasted children under 3 years of age is very low among children of all ages, across sex, district and study groups. The prevalence of moderate and severe wasting (-2SD) was 2.5 percent in the treatment group and 2.1 percent in the comparison group for children under 3 years of age.

Middle upper arm circumference (MUAC) measurement is an indicator for acute malnutrition for children 6 to 60 months of age. A MUAC measurement below 12.5 cm is considered moderate acute malnutrition and below 11.0 cm is considered severe acute malnutrition.<sup>27</sup>

The prevalence of malnutrition in our sample as measured by MUAC was very low across groups. The percent of children aged 6-35 months with severe acute malnutrition was 0.5 percent in both treatment and comparison groups. The percent of children with moderate or severe acute malnutrition was 3.6 percent in the treatment group and 3.5 percent in the comparison group. Table 9.8 shows the highest percent of children with moderate or severe acute malnutrition was among children 6-11 months of age in the treatment group (8.9 percent).

<sup>27</sup> Mother and Child Nutrition: <http://motherchildnutrition.org/early-malnutrition-detection/detection-referral-children-with-acute-malnutrition/interpretation-of-muac-indicators.html>

**Table 9.8. Prevalence of malnourished children 6-35 months of age (MUAC)**

	MUAC – treatment				MUAC – comparison			
	% Below 11.0 cm	% Below 12.5 cm	Mean cm	n	% Below 11.0 cm	% Below 12.5 cm	Mean cm	n
<b>Children 6-35 months</b>	0.5	3.6	14.5	1,490	0.5	3.5	14.4	1,593
<b>Age in months</b>								
6-11	1.4	8.9	14.1	321	1.1	6.4	14.0	352
12-17	0.0	4.1	14.3	274	0.0	3.4	14.2	319
18-23	0.4	1.3	14.5	373	0.7	3.8	14.4	348
24-35	0.1	1.8	14.9	522	0.1	1.4	14.8	574
<b>Sex</b>								
Male	0.2	2.7	14.6	735	0.8	2.6	14.5	777
Female	0.7	4.5	14.4	755	0.2	4.3	14.3	816
<b>District</b>								
Lilongwe	0.4	3.7	14.5	967	0.6	3.7	14.5	908
Mchinji	0.6	3.4	14.5	523	0.3	3.3	14.3	685

DK/Refused/Missing responses less than 1 percent are not reported.

### 9.3 Child Health and Use of Services

Over 80 percent of children under 3 had received vitamin A in the past six months and approximately 70 percent of children reported a growth monitoring visit to a health facility in the past 12 months. Receipt of vitamin A and growth monitoring was similar for males and females. A small percentage of children had received an in-home MUAC measurement or encouragement to attend facility-based growth monitoring in the last 12 months (approximately 10 percent and 25 percent in both groups, respectively) and an even smaller percentage of children received advice or supplies regarding therapeutic foods. Receipt of one or more oral polio vaccine doses (OPV) was almost universal across groups and gender (Table 9.9).

**Table 9.9. Health services received by children 0-35 months of age**

Health service	Treatment	n	Comparison	n
<b>Vitamin A in last 6 months</b>				
Males	82.8	909	81.6	965
Females	81.4	911	85.4	995
<b>Total</b>	<b>82.1</b>	<b>1,820</b>	<b>83.5</b>	<b>1,960</b>
<b>Facility growth monitoring visit in last 12 months</b>				
Males	71.0	909	67.9	965
Females	73.3	911	70.2	995
<b>Total</b>	<b>70.8</b>	<b>1,820</b>	<b>68.5</b>	<b>1,960</b>
<b>Growth monitoring and advice received in last 12 months</b>				
Home visit to measure mid-upper arm circumference	8.0	1,820	11.0	1,960
Advised to visit health facility for growth monitoring	25.0	1,820	23.3	1,960
<b>Therapeutic foods in last 12 months</b>				
Advised to visit health facility to obtain therapeutic foods	5.5	1,820	3.6	1,960
Took child to health facility to obtain therapeutic foods	2.7	1,820	1.6	1,960
Number of times therapeutic food received (per child, among those taken to facility for therapeutic food)	5.9	46	3.3	37
<b>Received one or more doses OPV*</b>				
Males	97.7	888	97.4	929
Females	97.4	882	98.4	968
<b>Total</b>	<b>97.6</b>	<b>1,770</b>	<b>97.9</b>	<b>1,897</b>

DK/Refused/Missing responses less than 1 percent are not reported.

\* Received one or more doses OPV was missing in 2.8 percent and 4.5 percent of males in the treatment and comparison groups, respectively, and in 3.9 percent and 3.5 percent of females in treatment and comparison groups, respectively.

## 10. Women’s Nutrition and Health

This chapter contains information collected from all women of reproductive age in surveyed households. Demographic information was collected and the women were asked to provide a birth history and information about dietary diversity. Women were also asked about their use of health services during pregnancy, childbirth, and postpartum for any births since 2011.

### 10.1 Women’s Population Characteristics

Characteristics of WRA across the treatment and comparison groups were similar (Table 10.1). A majority of WRA in the sample was 20-29 years old, just over one-third had 2-3 children, and almost all had given birth in the last three years; which is not surprising given that a household member under the age of 3 was an eligibility requirement. Literacy was similar in both groups; almost 60 percent of women reported the ability to read and write, one-third reported the inability to read and write, and over 70 percent completed some standard education.

**Table 10.1. Characteristics of women of reproductive age**

Characteristic	Treatment	Comparison
<b>Age</b>		
15-19 years	9.7	11.0
20-29 years	54.8	58.8
30-39 years	30.1	25.4
40-49 years	5.4	4.8
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Parity</b>		
No living children	3.7	2.6
1 child	24.0	25.8
2-3 children	36.1	39.1
4-5 children	24.9	24.3
6 or more children	11.3	8.2
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Gave birth in past three years</b>		
Yes	94.1	96.0
No	5.8	3.9
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Literacy</b>		
Cannot read and write	33.5	31.6
Can sign (write) only	6.6	7.0
Can read only	1.7	1.3
Can read and write	58.1	59.9
<b>Total</b>	<b>100.0</b>	<b>100.0</b>

**Table 10.1. Characteristics of women of reproductive age (continued)**

Characteristic	Treatment	Comparison
<b>Highest grade of education completed</b>		
No formal schooling	15.3	14.1
Standard 1-4	32.8	30.0
Standard 5-8	41.3	41.8
Secondary 1-2	6.9	8.9
Secondary 3-4	3.3	3.9
University or above	0.1	0.2
Technical or vocational	0.0	0.1
Adult literacy	0.2	0.3
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of WRA</b>	<b>1,787</b>	<b>1,880</b>

DK/Refused/Missing responses less than 1 percent are not reported.

## 10.2 Women's Dietary Diversity

Women's dietary diversity is a measure of micronutrient adequacy of the diets of WRA created by summing the number of food groups consumed in the previous day. To calculate this indicator, information about foods consumed in the past 24 hours was collected and grouped into nine food groups as defined by the Feed the Future Indicator Handbook.<sup>28</sup> The food groups include: (1) grains, roots and tubers; (2) legumes and nuts; (3) dairy products; (4) organ meat; (5) eggs; (6) flesh foods and other miscellaneous small animal protein; (7) vitamin A dark green leafy vegetables; (8) other vitamin A-rich vegetables and fruits; and (9) other fruits and vegetables. The mean number of food groups consumed was calculated by averaging the number of food groups consumed across all women ages 15-49 in the sample.

The mean number of food groups consumed by WRA was significantly higher in the treatment group versus the comparison group although not substantively meaningful (Appendix B,  $p=0.01$ ); 3.1 and 3.0 mean food groups, respectively (Table 10.2). These results are slightly lower than the mean number of food groups consumed by women in the Malawi baseline PBS sample; 3.4 mean food groups.

<sup>28</sup> USAID. Feed the Future Handbook of Indicator Definitions (October 2014).

Available at: <http://feedthefuture.gov/resource/feed-future-handbook-indicator-definitions>.

**Table 10.2. Mean number of food groups consumed by women of reproductive age**

Characteristics	Treatment	n	Comparison	n
<b>Mean number of food groups</b>	<b>3.1</b>	<b>1,775</b>	<b>3.0</b>	<b>1,865</b>
<b>Age</b>				
15-19 years	2.9	166	2.9	151
20-29 years	3.2	1,016	3.1	1,137
30-39 years	3.2	507	3.0	489
40-49 years	2.8	86	3.2	88
<b>Highest level of education</b>				
No formal schooling	2.9	274	2.8	300
Standard 1-4	3.0	565	2.9	591
Standard 5-8	3.2	733	3.1	738
Secondary 1-2	3.6	131	3.3	161
Secondary 3-4	3.9	64	3.7	53
University or above	3.5	2	4.1	4
Technical or vocational	0.0	0	3.3	3
Adult literacy	3.2	3	3.6	6
Don't Know/Missing	4.0	3	2.3	9
<b>Age of youngest child</b>				
No children	2.8	53	2.9	42
0-5 months	3.1	247	3.1	285
6-11 months	3.0	304	3.1	337
12-23 months	3.2	592	3.0	607
24-35 months	3.2	468	3.0	519
36+ months	3.5	109	3.5	74
<b>Poverty</b>				
Ultra Poor	2.7	406	2.6	506
Poor	3.0	455	2.9	479
Non-poor	3.4	914	3.4	880

DK/Refused/Missing responses less than 1 percent are not reported.

### 10.3 Women's Use of Health Services

Delivery of antenatal, birth, and postnatal services are offered in Malawi through a mix of public and private venues, with the majority of care provided through the public sector. To extend public services to rural communities, the government trains and equips health surveillance agents (HSA) to provide basic maternal and child health services either directly in the home or at locally hosted village health clinics (VHC).

Table 10.3 provides information on women's health services, which was collected from all women of reproductive age who had given birth within the last three years. Use of these services was similar for women in treatment and comparison groups. In the treatment group, 78.8 percent of women received ANC services during the pregnancy related to her last birth, compared with 76.0 percent for women in the comparison group. The largest share of women sought care from a nurse or midwife. The public sector was used by a majority of women in both treatment (68.2 percent) and comparison groups (63.7 percent) and most women reported their first ANC visit during the second trimester. Among women who received ANC

care, weight measurement, dietary counseling, and blood pressure measurement were the most commonly reported services received in both the treatment and comparison groups.

**Table 10.3. Women’s antenatal care for last birth**

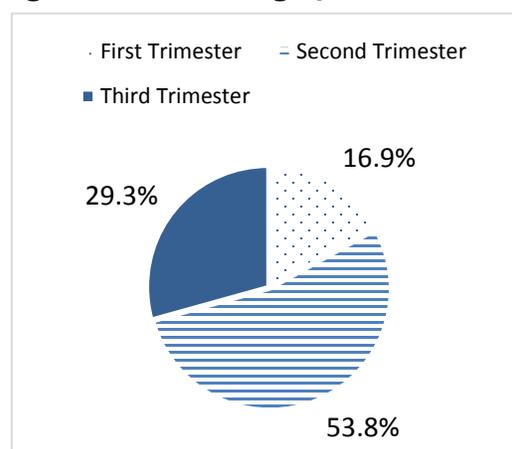
ANC at last birth	Treatment	Comparison
<b>Received ANC at last birth</b>		
Yes	78.8	76.0
No	21.2	24.0
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of women</b>	<b>1,613</b>	<b>1,759</b>
<b>Among those who received ANC at last birth:</b>		
<b>Care Provider*</b>		
Doctor or Clinical Officer	35.0	33.9
Nurse or Midwife	43.9	41.7
Patient Attendant or HSA	6.2	7.3
Traditional/Untrained Birth Attendant	5.5	5.2
No one	21.2	24.1
<b>Location of ANC*</b>		
Home	6.8	6.5
Public Sector	68.2	63.7
CHAM/Mission	2.6	2.5
Private Medical Sector	2.8	5.4
Other	0.1	0.6
<b>Timing of first ANC visit</b>		
0-3 months	16.6	17.3
4-5 months	53.8	53.7
6-9 months	29.6	28.9
Total	100.0	100.0
<b>Components of ANC received*</b>		
Weight measured	97.4	98.2
Height measured	30.7	33.9
Blood pressure measured	80.2	83.2
Eyesight checked	74.3	77.1
Dietary counseling	85.5	90.3
<b>Number of women receiving ANC</b>	<b>1,264</b>	<b>1,289</b>

\* Multiple responses possible, percentages will not sum to 100 percent.

DK/Refused/Missing responses less than 1 percent are not reported.

Figure 10.1 depicts when women sought ANC during their last pregnancy in treatment and comparison sites combined. Initiation of ANC is recommended during the first trimester as an opportunity to provide maternal nutrition and health education as well as identify any health concerns for mother or baby. Only 16.9 percent of women sought antenatal care during their first trimester. Over half of women in treatment and comparison sites combined sought antenatal care during their second trimester (53.8 percent).

**Figure 10.1. Timing of antenatal care**



A large majority of women delivered most recently in a health facility with 81.2 percent and 77.0 percent of women in treatment and comparison groups delivering in a public sector facility, respectively (Table 10.4). Women most frequently received care from a nurse, midwife, physician or clinical officer during this delivery (Table 10.4).

Over half of the women in both treatment and comparison groups received postnatal care before discharge (53.4 percent and 47.5 percent) or after discharge (17.7 percent and 15.0 percent). However, over 40 percent of all women did not receive any postnatal care (Table 10.5). Postnatal care was most frequently provided by a doctor or clinical officer, followed by a nurse or midwife, with the exception of postnatal care post-discharge in the comparison group, which received more services from a nurse or midwife. The type of information received during postnatal care was similar for all women.

**Table 10.4. Women’s delivery care at last birth**

Labor and delivery at last birth	Treatment	Comparison
<b>Location of delivery</b>		
Public Sector	81.2	77.0
CHAM/Mission	4.4	6.5
Private Medical Sector	4.6	8.8
Home	6.8	5.4
Other	3.1	2.3
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Care provider*</b>		
Doctor or Clinical Officer	42.0	46.2
Nurse or Midwife	50.8	51.2
Patient Attendant or HSA	2.9	2.8
Traditional/Untrained Birth Attendant	8.6	5.5
Family or Friend	4.3	4.0
No one	1.4	1.1
<b>Number of women</b>	<b>1,613</b>	<b>1,759</b>

\* Multiple responses possible, percentages will not sum to 100 percent.

DK/Refused/Missing responses less than 1 percent are not reported.

**Table 10.5. Women's postnatal care following last birth**

	Treatment	Comparison
<b>Postnatal care status*</b>		
Received postnatal care before discharge	53.4	47.5
Received postnatal care after discharge	17.7	15.0
Received postnatal care after home delivery	1.3	0.6
Did not receive postnatal care	42.0	49.0
<b>Number of women</b>	<b>1,613</b>	<b>1,759</b>
<b>Postnatal care BEFORE discharge</b>		
<b>Care Provider</b>		
Doctor or Clinical Officer	54.7	53.0
Nurse or Midwife	42.5	44.6
Patient Attendant or HSA	2.0	1.4
Traditional/Untrained Birth Attendant	0.5	0.5
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Information received*</b>		
Signs of complication	64.5	73.7
Breastfeeding	88.7	88.1
Mother's nutrition	78.3	79.9
Infant's nutrition	74.8	80.1
Childhood illness	55.1	51.7
<b>Number of women who received care before discharge</b>	<b>862</b>	<b>835</b>
<b>Postnatal care AFTER discharge or home delivery</b>		
<b>Care Provider</b>		
Doctor or Clinical Officer	48.7	34.9
Nurse or Midwife	40.7	43.6
Patient Attendant or HSA	6.2	12.9
Traditional/Untrained Birth Attendant	4.4	8.6
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Information received*</b>		
Signs of complication	94.8	98.8
Breastfeeding	99.1	99.7
Mother's nutrition	98.6	99.3
Infant's nutrition	98.2	98.9
Childhood illness	97.3	98.0
<b>Number of women who received care after discharge</b>	<b>306</b>	<b>274</b>

\* Multiple responses possible, percentages will not sum to 100 percent.

DK/Refused/Missing responses less than 1 percent are not reported.

## 11. Nutrition and Hygiene Knowledge and Exposure

Nutrition and hygiene knowledge and information exposure was assessed for all WRA in addition to all caregivers (female and male) of children under the age of 3. Choice of knowledge questions was based on INVC's proposed nutrition and hygiene curricula. Due to length of survey, questions were limited to knowledge rather than evaluation of practice. Eleven (0.36 percent) of the 3,690 caregiver respondents were male. All WRA responded regardless of their caregiver status.

### 11.1 Child Nutrition Awareness and Information

Respondents across groups had similar knowledge about infant feeding (Table 11.1). Over three-quarters of respondents in both groups knew to initiate breastfeeding immediately or within the first hour after delivery and to continue breastfeeding until at least 24 months of age. Over 70 percent of respondents in both groups also knew that babies should be exclusively breastfed from birth to 6 months of age. About one-third of respondents knew to introduce complementary foods at 6 months, yet the majority reported later introduction of complementary foods. The majority of respondents also believed that babies should be given less food than usual when sick and more food than usual when recovering from sickness.

**Table 11.1. Knowledge of infant feeding**

Infant Feeding	Treatment	Comparison
<b>When should a mother first put baby to the breast after delivery?</b>		
Immediately	30.6	34.0
Within the first hour	48.8	46.7
Between 1-8 hours	4.9	3.9
After the first 8 hours	1.0	0.5
Don't know/Missing	14.6	14.9
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>How long should a baby receive nothing more than breast milk?</b>		
Birth to 6 months	72.0	70.2
Less than 6 months	9.1	7.0
More than 6 months	14.2	18.8
Don't know/Missing	4.8	4.1
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>How long should a woman breastfeed her child?</b>		
6 months or less	3.0	2.7
6-11 months	4.9	4.2
12-23 months	9.4	13.1
24 months or more	77.2	75.6
Other	0.9	0.5
Don't know/Missing	4.6	3.9
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>At what age should babies start eating foods in addition to breast milk?</b>		
Less than 6 months	6.6	9.2
At 6 months	35.3	32.1
More than 6 months	54.0	55.4
Don't know/Missing	4.2	3.2
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>When a baby is sick, how much food should be given?</b>		
Same amount	16.3	16.9
Less food than usual	55.2	54.8
More food than usual	24.6	24.4
Don't know/Missing	3.9	3.9
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>When a baby is recovering, how much food should be given?</b>		
Same amount	16.6	15.0
Less food than usual	18.0	17.3
More food than usual	61.8	63.6
Don't know/Missing	3.6	4.1
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of respondents</b>	<b>1,800</b>	<b>1,890</b>

DK/Refused/Missing responses less than 1 percent are not reported.

Knowledge about child nutrition was similar for respondents in the treatment and comparison groups (Table 11.2). Approximately 70 percent of respondents recognized that lack of energy or weakness and loss of weight or thinness were signs of under-nutrition. Only about 40 percent of respondents knew that a weak immune system and growth faltering may also

indicate under-nutrition. Approximately 80 percent of respondents reported exclusive breastfeeding as one strategy to prevent under-nutrition among infants under 6 months of age, yet less than 40 percent believed that growth monitoring could help to prevent under-nutrition among infants under 6 months old. For infants 6-23 months old, three-quarters of respondents thought that more food and more frequent feeding could help to prevent under-nutrition. Only approximately one-quarter of respondents thought that growth monitoring and giving attention during meals could help to prevent under-nutrition. Over 70 percent of respondents in treatment and comparison groups thought their child was under-nourished and these respondents almost universally recognized under-nutrition as a serious health problem.

**Table 11.2. Child nutrition knowledge**

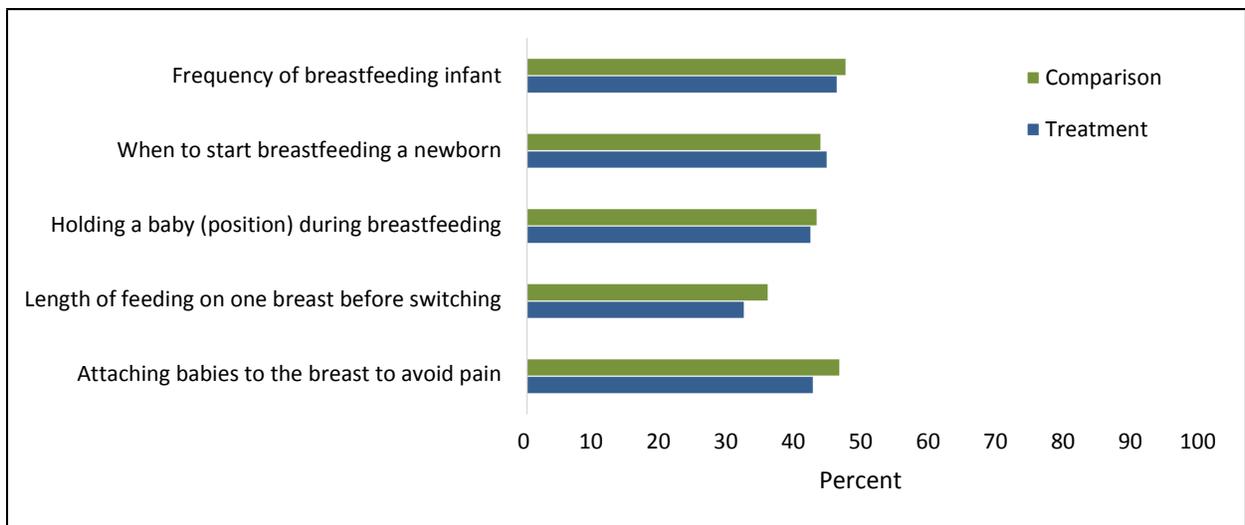
Child under-nutrition	Treatment	Comparison
<b>How can one recognize if a child is not receiving enough food?*</b>		
Lack of energy/weakness	69.2	70.2
Weak immune system, becomes ill easily	39.2	41.6
Loss of weight/thinness	69.8	72.6
Growth faltering	37.3	38.5
Other	6.3	6.1
Don't know/Missing	5.2	5.7
<b>What can one do to prevent under-nutrition among infants &lt;6 months?*</b>		
Breastfeed exclusively	78.6	80.4
Check child's growth at health facility	31.8	37.8
Other	10.1	8.5
Don't know/Missing	6.8	6.0
<b>What can one do to prevent under-nutrition among children 6-23 months*</b>		
Give more food	74.9	76.6
Feed frequently	73.7	74.0
Give attention during meals	27.1	32.1
Check child's growth at health facility	22.4	27.8
Other	8.5	7.0
Don't know/Missing	4.7	3.9
<b>How likely do you think it is that your child is under-nourished?</b>		
Not likely	26.6	23.0
Not sure	1.6	1.7
Likely	70.3	74.6
Don't know/Missing	1.5	0.7
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>How serious do you think under-nutrition is for a baby's health?</b>		
Not serious	1.8	2.0
Not sure	1.4	1.1
Serious	95.3	96.1
Don't know/Missing	1.5	0.9
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of respondents</b>	<b>1,800</b>	<b>1,890</b>

\* Multiple responses possible, percentages will not sum to 100 percent.

DK/Refused/Missing responses less than 1 percent are not reported.

Respondents in treatment and comparison groups received similar nutrition information for newborns in the last 12 months (Table 11.3). Just under half of respondents had received information about how to attach young babies to the breast to avoid causing pain, how long to breastfeed before changing to the other breast, what position to use during breastfeeding, and when and how often to feed a newborn (Figure 11.1). When received, the information was most frequently provided in-person at the health center. Health surveillance agents (HSAs) were also a prominent but less frequent source of information. Care group meetings were a small but consistently mentioned delivery method for this information, ranging from 3.8 to 12.3 percent; however this was only among the caregivers who reported receiving any information (ranging from 31.9 to 46.8 percent).

**Figure 11.1 Nutrition information for newborns received in last 12 months**



Provision of nutrition information for infants and children followed a similar pattern as provision of information for newborns (Table 11.4). Approximately half of respondents had received information on when to introduce other food or liquids to infants, what foods or liquids to introduce, and how often to feed infants and young children (Figure 11.2). Information was provided primarily in-person at the health center.

**Table 11.3. Nutrition information for newborns received in last 12 months**

	Attaching babies to the breast to avoid pain		Length of feeding on one breast before switching		Baby positioning during breastfeeding		Breastfeeding initiation		Frequency of breastfeeding	
	Treat.	Comp.	Treat.	Comp.	Treat.	Comp.	Treat.	Comp.	Treat.	Comp.
<b>Information received</b>										
Yes	42.0	45.8	31.9	35.4	41.7	42.5	44.0	43.2	45.6	46.8
No	56.3	52.6	66.5	63.3	56.9	56.3	54.3	55.1	52.4	51.2
Don't know/Missing	1.7	1.7	1.5	1.3	1.4	1.3	1.8	1.7	2.0	1.9
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of respondents</b>	<b>1,800</b>	<b>1,890</b>	<b>1,800</b>	<b>1,890</b>	<b>1,800</b>	<b>1,890</b>	<b>1,800</b>	<b>1,890</b>	<b>1,800</b>	<b>1,890</b>
<b>Among those who received this information</b>										
<b>Most important source of information</b>										
Health Center	66.6	65.8	64.1	58.5	66.5	60.2	70.3	64.2	68.1	62.0
HSA	29.5	30.7	32.8	36.8	29.7	34.9	28.0	33.1	27.7	34.6
CCG Leader	0.2	1.6	0.3	2.1	0.6	2.0	0.6	1.8	0.2	0.3
Drama, TV, or radio	1.3	0.2	0.6	0.6	0.6	1.3	0.2	0.5	1.0	1.5
Poster/Pamphlet/Paper	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Neighbor/Friend	2.2	1.7	2.2	1.7	2.5	1.5	0.8	0.3	2.5	1.6
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Message delivery method</b>										
Individual Meeting	92.4	84.9	91.7	86.8	92.7	86.1	93.6	88.6	95.2	89.5
CCG Meeting	4.6	12.3	5.7	10.1	5.3	10.4	4.5	9.1	3.8	8.1
Demonstration	2.5	2.6	2.3	3.1	1.8	3.1	1.9	1.9	0.5	2.2
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Where message was received</b>										
Health Center	92.6	91.8	91.9	89.0	92.2	89.5	95.8	92.9	92.4	91.6
Own Home	3.4	4.3	4.3	5.8	3.9	5.4	1.7	3.3	3.8	4.3
Other's Home	1.2	0.9	1.3	0.7	1.4	1.1	0.8	0.2	1.9	1.0
Community Meeting	2.7	3.0	2.4	4.5	2.4	3.9	1.6	3.6	1.8	3.2
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of respondents</b>	<b>742</b>	<b>795</b>	<b>585</b>	<b>618</b>	<b>747</b>	<b>761</b>	<b>781</b>	<b>817</b>	<b>810</b>	<b>882</b>

DK/Refused/Missing and Other responses less than 1 percent are not reported.

HSA=health surveillance agent.

CCG=community care group.

**Table 11.4. Nutrition information for infants and children received in last 12 months**

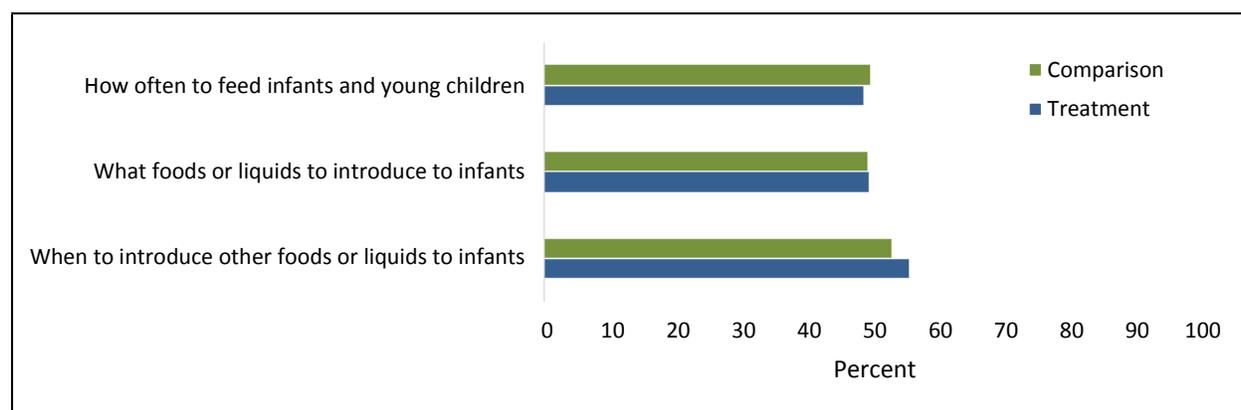
	When to introduce other foods or liquids to infants		What foods or liquids to introduce to infants		How often to feed infants and young children	
	Treatment	Comparison	Treatment	Comparison	Treatment	Comparison
<b>Information received</b>						
Yes	55.4	52.6	49.3	49.1	48.4	49.5
No	43.2	46.2	49.2	50.0	50.0	49.4
Don't know/Missing	1.4	1.2	1.5	0.9	1.6	1.1
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of respondents</b>	<b>1,800</b>	<b>1,890</b>	<b>1,800</b>	<b>1,890</b>	<b>1,800</b>	<b>1,890</b>
<b>Among those who received this information</b>						
<b>Most important source of information</b>						
Health Center	70.1	65.5	68.6	65.3	65.3	61.2
HSA	26.7	31.8	27.9	32.1	29.6	33.8
CCG Leader	0.1	0.6	0.3	0.8	0.3	0.6
Drama, TV, or radio	1.6	0.6	2.2	0.8	2.3	2.3
Poster/Pamphlet/Paper	0.0	0.1	0.0	0.1	0.0	0.0
Neighbor/Friend	1.3	1.2	0.9	0.6	2.4	1.8
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Message delivery method</b>						
Individual Meeting	93.8	89.1	94.2	89.5	92.6	88.7
CCG Meeting	4.4	9.1	4.4	8.3	5.3	8.6
Demonstration	1.6	1.7	1.1	2.0	1.4	2.4
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Where message was received</b>						
Health Center	93.5	93.2	93.3	92.6	89.3	89.8
Own home	3.5	3.2	4.2	3.1	6.0	5.7
Other's Home	0.9	0.6	0.6	0.5	1.5	1.2
Community Meeting	2.1	3.0	1.8	3.7	3.1	3.3
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of respondents</b>	<b>1,001</b>	<b>1,017</b>	<b>873</b>	<b>925</b>	<b>870</b>	<b>911</b>

DK/Refused/Missing and Other responses less than 1 percent are not reported.

HSA=health surveillance agent.

CCG=community care group.

**Figure 11.2. Nutrition information for infants and children received in the last 12 months**



## 11.2 Maternal Nutritional Awareness and Information

Almost 90 percent of women knew that women should eat more food during pregnancy. Over one-third of women knew that pregnant women should eat more iron-rich foods and about two-thirds knew pregnant women should eat more protein-rich foods. Almost one-third of women knew all three of these recommendations (Table 11.5). Knowledge patterns were similar regarding nutrition for lactating women.

**Table 11.5. Maternal nutrition knowledge**

Maternal nutrition	Treatment	Comparison
<b>Know recommendation that pregnant women should eat more food, more protein-rich food and more iron-rich food</b>	28.6	32.2
<b>How should a pregnant woman eat in comparison with a nonpregnant woman to provide good nutrition to her baby?*</b>		
Eat more food	89.4	88.1
Eat more protein-rich food	62.4	63.7
Eat more iron-rich food	35.7	40.6
Use iodized salt when preparing meals	18.8	21.4
Other	5.4	4.1
Don't know	3.1	2.6
<b>How should a lactating woman eat in comparison with a non-lactating woman to be healthy and produce more breastmilk?*</b>		
Eat more food	91.5	90.2
Eat more protein-rich food	55.8	60.0
Eat more iron-rich food	28.9	37.3
Use iodized salt when preparing meals	15.9	21.2
Other	4.4	4.5
Don't know	2.9	2.5
<b>Number of respondents</b>	<b>1,800</b>	<b>1,890</b>

\* Multiple responses possible, percentages will not sum to 100 percent.

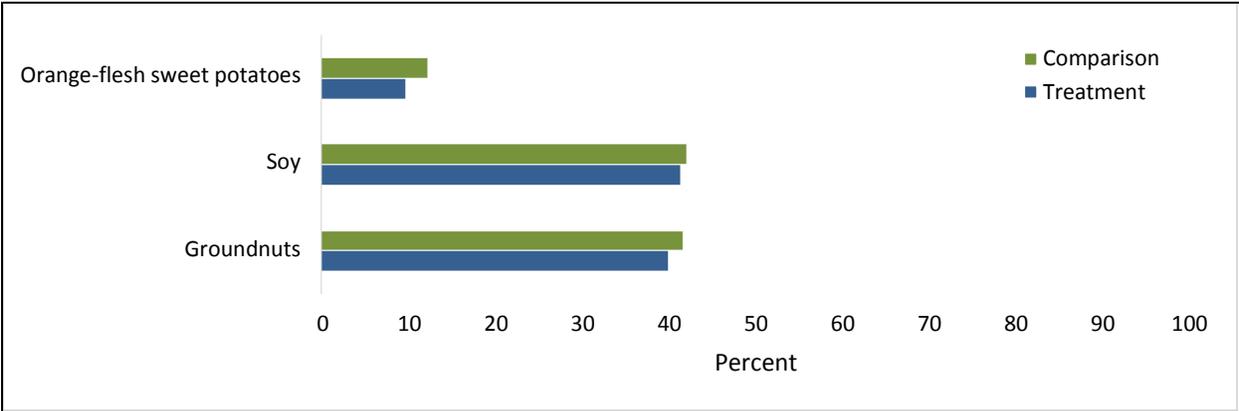
DK/Refused/Missing responses less than 1 percent are not reported.

Provision of nutrition information related to pregnant and lactating women (Table 11.6) followed a similar pattern as provision of information for newborns, infants and children (Tables 11.3 and 11.4). Approximately half of the respondents had received information on what and how much food to eat when pregnant and lactating. Again, information was provided primarily in-person and at the health center.

### 11.3 Meal Preparation, Hygiene and Sanitation

Provision of information about nutritious meal preparation was similar across treatment and comparison groups (Figure 11.3). Approximately 40 percent of respondents reported receiving information about how to prepare groundnuts and soy. Only about 10 percent reported receiving information about how to prepare meals using orange-flesh sweet potatoes.

**Figure 11.3. Nutritious meal preparation information received in last 12 months**



The health center was the main source of information for about half of respondents, and health surveillance agents were also a prominent source of this information. Neighbors and friends emerged as an important source of information for between 6.0 percent and 11.7 percent of respondents (Table 11.7).

**Table 11.6. Nutrition information for pregnant or lactating women received in last 12 months**

	During Pregnancy				During Breastfeeding			
	Which food to eat		How much food to eat		Which food to eat		How much food to eat	
	Treatment	Comparison	Treatment	Comparison	Treatment	Comparison	Treatment	Comparison
<b>Information received</b>								
Yes	51.8	51.5	43.8	47.2	50.6	53.1	42.7	45.4
No	46.3	46.8	54.7	51.6	47.5	45.1	55.9	53.5
Don't know/Missing	1.8	1.7	1.6	1.1	1.9	1.8	1.5	1.1
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of respondents</b>	<b>1,800</b>	<b>1,890</b>	<b>1,800</b>	<b>1,890</b>	<b>1,800</b>	<b>1,890</b>	<b>1,800</b>	<b>1,890</b>
<b>Among those who received this information</b>								
<b>Most important source of information</b>								
Health Center	64.9	61.3	65.3	62.7	66.0	65.4	67.3	62.2
HSA	30.4	36.1	31.3	35.2	29.3	31.9	30.7	35.7
CCG Leader	1.4	0.6	0.6	0.6	0.8	0.4	0.1	0.1
Drama, TV, or radio	1.6	0.8	1.2	0.5	2.0	0.9	0.4	0.5
Poster/Pamphlet/Paper	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Neighbor/Friend	1.4	0.6	1.4	0.5	1.8	1.0	1.3	1.2
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Message delivery method</b>								
Individual Meeting	91.5	84.4	91.6	84.1	93.1	86.0	92.8	86.2
CCG Meeting	5.1	12.4	5.5	13.6	4.6	11.3	4.8	11.7
Demonstration	2.8	2.4	2.5	2.2	2.1	2.1	2.1	2.0
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Where message was received</b>								
Health Center	88.8	89.1	90.8	91.8	89.9	90.9	93.8	92.1
Own Home	5.2	3.9	4.5	2.8	5.1	3.8	2.9	4.5
Other's Home	1.3	0.9	0.9	0.7	1.3	0.8	1.0	0.7
Community Meeting	4.8	6.0	3.7	4.7	3.7	4.4	2.3	2.7
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of Respondents</b>	<b>928</b>	<b>924</b>	<b>794</b>	<b>859</b>	<b>899</b>	<b>965</b>	<b>772</b>	<b>825</b>

DK/Refused/Missing and Other responses less than 1 percent are not reported.

HSA=health surveillance agent.

CCG=community care group.

**Table 11.7. Nutritious meal preparation information received in last 12 months**

	Groundnuts		Soy		Orange-flesh sweet potatoes	
	Treatment	Comparison	Treatment	Comparison	Treatment	Comparison
<b>How to prepare meals using...</b>						
Yes	40.5	42.2	41.9	42.6	9.8	12.4
No	58.0	56.5	56.2	56.1	88.8	86.6
Don't know/Missing	1.5	1.3	1.9	1.3	1.4	1.0
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of Respondents</b>	<b>1,800</b>	<b>1,890</b>	<b>1,800</b>	<b>1,890</b>	<b>1,800</b>	<b>1,890</b>
<b>Among those who received this information</b>						
<b>Most important source of information</b>						
Health Center	50.6	49.3	53.2	50.8	60.6	42.8
HSA	37.0	40.2	34.9	39.1	20.8	40.8
CCG Leader	0.6	0.9	1.2	0.9	1.7	2.5
Drama, TV, or radio	2.3	1.8	1.5	2.3	3.5	3.0
Poster/Pamphlet/Paper	0.0	0.0	0.1	0.0	0.0	0.0
Neighbor/Friend	9.2	7.5	8.2	6.0	11.7	9.8
Other	0.3	0.3	0.9	0.9	1.6	1.1
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Message delivery method</b>						
Individual Meeting	90.1	86.2	91.0	86.2	85.7	88.7
CCG Meeting	5.7	9.5	4.7	9.3	7.1	8.1
Demonstration	3.3	4.0	3.4	4.0	5.4	2.6
Other	0.9	0.3	0.8	0.5	1.8	0.6
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Where message was received</b>						
Health Center	77.9	79.4	81.3	82.4	73.9	73.5
Own Home	10.9	8.1	7.3	8.2	9.1	10.8
Other's Home	3.2	6.0	3.8	3.3	5.0	3.5
Community Meeting	7.9	6.4	7.5	6.1	12.0	12.2
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of respondents</b>	<b>715</b>	<b>738</b>	<b>748</b>	<b>758</b>	<b>178</b>	<b>215</b>

DK/Refused/Missing responses less than 1 percent are not reported.

HSA=health surveillance agent.

CCG=community care group.

Under half of respondents knew at least four key times when hand washing is recommended; fewer in the treatment group (41.9 percent) than in the comparison group (46.4 percent) (Table 11.8 and Appendix B (p=0.00)). Over four-fifths of respondents in both groups thought it was likely that their child would become sick from their not washing hands, and almost universally thought that the illness could be serious. To ensure safe cooking and drinking water, over three-quarters of respondents in both groups reported that water could be boiled or disinfected with bleach or chlorine. About 30 percent of respondents in both groups thought water could be decontaminated by straining it through a cloth (Table 11.9).

**Table 11.8. Hygiene and sanitation knowledge**

Hygiene and sanitation	Treatment	Comparison
<b>Know at least four key times when hand washing is recommended</b>	41.9	46.4
<b>At which key moments should hands be washed in order to prevent germs from reaching food?*</b>		
After going to the toilet/latrine	92.3	94.6
After cleaning the baby's bottom/changing a baby's nappy	73.4	79.0
Before preparing/handling food	65.3	67.2
Before feeding a child/eating	55.3	56.9
After handling raw food	19.5	22.6
After handling garbage	26.4	31.4
Other	1.6	1.3
Don't know/Missing	2.5	1.6
<b>How likely do you think it is that your child will become sick, such as with a stomach ache or diarrhea, from you not washing hands?</b>		
Not likely	12.0	10.7
Not sure	1.4	0.5
Likely	85.3	88.1
Don't know/Missing	1.3	0.7
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>How serious is it if you or your child gets sick from you not washing your hands?</b>		
Not serious	1.8	1.5
Not sure	1.7	0.4
Serious	95.4	97.4
Don't know/Missing	1.2	0.6
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>What should be done to water that will be used for cooking or drinking if it is not safe or does not come from a safe source?*</b>		
Boil it	75.0	76.0
Add bleach/chlorine	75.5	80.4
Strain it through a cloth	30.9	30.8
Pour through water filter	5.8	7.2
Use solar disinfection	2.8	3.0
Let it stand and settle	7.2	7.5
Discard it and get water from a safe source	4.3	4.5
Don't know/Missing	3.1	2.4
<b>Number of respondents</b>	<b>1,800</b>	<b>1,890</b>

\* Multiple responses possible, percentages will not sum to 100 percent.

**Table 11.9. Hygiene and sanitation information received in last 12 months**

	Hand washing, how and when to do it		Treating or filtering water before drinking		How to dispose of rubbish		How to dig a refuse pit	
	Treatment	Comparison	Treatment	Comparison	Treatment	Comparison	Treatment	Comparison
<b>Information received</b>								
Yes	63.8	62.4	60.4	57.8	61.3	59.6	58.3	54.4
No	34.9	36.3	38.4	40.7	37.3	39.6	40.4	44.9
Don't know/Missing	1.3	1.3	1.3	1.5	1.5	0.8	1.3	0.7
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of respondents</b>	<b>1,800</b>	<b>1,890</b>	<b>1,800</b>	<b>1,890</b>	<b>1,800</b>	<b>1,890</b>	<b>1,800</b>	<b>1,890</b>
<b>Among those who received this information</b>								
<b>Most important source of information</b>								
Health Center	37.0	32.8	33.6	29.6	28.3	24.3	28.0	24.2
HSA	55.2	61.0	59.9	63.2	65.3	68.6	66.9	69.6
CCG Leader	0.7	0.7	0.9	0.9	0.9	2.2	0.5	1.4
Drama, TV, or radio	5.3	2.9	3.3	3.5	2.8	2.1	2.3	1.7
Poster/Pamphlet/Paper	0.1	0.3	0.3	0.3	0.1	0.1	0.1	0.1
Neighbor/Friend	1.2	1.9	1.2	1.9	2.1	2.2	1.4	2.1
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Message delivery method</b>								
Individual Meeting	80.8	77.6	79.3	77.9	77.7	74.0	78.0	72.8
CCG Meeting	13.4	15.8	15.1	15.8	17.2	19.9	15.9	20.4
Demonstration	4.0	5.3	4.5	5.6	4.1	5.8	5.4	6.5
Other	1.9	1.2	1.1	0.7	1.0	0.3	0.7	0.3
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Where message was received</b>								
Health Center	60.2	57.5	54.7	55.3	46.4	47.3	45.1	43.8
Own home	11.4	16.6	12.0	15.5	15.5	19.0	16.5	20.1
Home of Neighbor/Friend	2.3	2.2	2.1	2.5	1.8	2.6	1.0	1.8
Community Meeting	26.0	23.6	31.2	26.6	36.3	31.1	37.4	34.2
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of respondents</b>	<b>1,155</b>	<b>1,206</b>	<b>1,093</b>	<b>1,104</b>	<b>1,106</b>	<b>1,137</b>	<b>1,051</b>	<b>1,042</b>

DK/Refused/Missing and Other responses less than 1 percent are not reported.

HSA=health surveillance agent.

CCG=community care group.

Receipt of hygiene and sanitation information was similar across treatment and comparison groups. Approximately 60 percent of respondents had received information about how and when to wash hands, treating or filtering drinking water, disposing of rubbish, and digging a refuse pit. Health surveillance agents were the most important sources of information on all topics, followed by the health center. Most information was provided through individual face-to-face interactions. Care group meetings were the second most frequent delivery method. Messages were received most at health centers followed by community meetings.

Participation in a community care group was low in both treatment and comparison groups in the last twelve months (Table 11.10), which was to be expected. While 6.9 and 8.9 percent of respondents in the treatment and comparison groups, respectively, reported receiving a visit from a care group leader, only up to 5 percent across either group reported actually participating.

**Table 11.10. Community care group participation in the last 12 months**

Participation in last 12 months*	Treatment	Comparison
Led a care group	1.9	1.5
Participated in care group	4.8	5.0
Received a visit from a care group leader	6.9	8.9
Participated in a cooking demonstration	5.6	4.6
Tended a kitchen garden	4.2	2.5
Visited a demonstration kitchen garden	4.8	3.2
<b>Number of respondents</b>	<b>1,777</b>	<b>1,872</b>

\* Multiple responses possible, percentages will not sum to 100 percent.

DK/Refused/Missing responses less than 1 percent are not reported.

## 12. Community Characteristics

The intent of the community survey was to collect information on services available as well as cultural norms and recent shocks to the community as a whole, in all 385 villages from the final sample of uncontaminated villages where at least one household was interviewed. The response rate was less robust than for household interviewing, with only 288 (74.8 percent) of the communities participating; 68.8 percent of the treatment sites and 80.6 percent of the comparison sites. Community survey results should be interpreted cautiously due to the smaller sample.

A majority of communities, 75.4 percent of the treatment sites and 65.8 percent of the comparison sites, reported primary access by a maintained dirt road, followed by access via a dirt track (Table 12.1). On average, the main road to the community was passable 7-8 months per year, and over half of the sites reported passable roads year-round.

**Table 12.1. Community infrastructure and services**

Basic service/infrastructure	Treatment	Comparison
<b>Transportation</b>		
<b>Type of main access road</b>		
Tar/asphalt	3.1	7.6
Graded graveled	8.5	5.1
Dirt road (maintained)	75.4	65.8
Dirt track	13.1	21.5
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Passable main road year round</b>		
Yes	64.6	55.7
No	35.4	43.7
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Number months main road was passable by mini-bus</b>	7.2	8.1
<b>Distance to nearest asphalt road (km)</b>	16.7	9.1
<b>Transport cost by mini-bus to nearest district capital (MWK)</b>	680.38	733.44
<b>Access to market</b>		
<b>Village has a market</b>		
Yes	10.0	23.4
No	90.0	76.6
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Larger weekly market takes place in community</b>		
Yes	33.8	50.6
No	66.2	49.4
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Permanent ADMARC market in this community</b>		
Yes	83.8	72.8
No	16.2	27.2
<b>Total</b>	<b>100.0</b>	<b>100.0</b>

**Table 12.1. Community infrastructure and services (continued)**

Basic service/infrastructure	Treatment	Comparison
<b>Distance (km) to</b>		
Daily market	13.2	17.0
Larger weekly market	8.5	7.4
Permanent ADMARC market	11.3	8.0
Nearest place to buy common medicines	2.3	1.6
<b>Schools</b>		
<b>Distance (km) to nearest government</b>		
Primary school	2.5	2.1
Secondary school	18.1	15.2
Community day secondary school	7.8	6.8
<b>Communities with a private primary school</b>	7.7	5.1
<b>Communities with a private secondary school</b>	10.8	10.1
<b>Community utilities</b>		
<b>Electricity</b>		
Yes	6.2	8.2
No	93.1	91.8
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Piped water</b>		
Yes	5.4	2.5
No	94.6	96.2
Don't know/Missing	0.0	1.3
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Landline telephone</b>		
Yes	4.6	4.4
No	95.4	95.6
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of villages</b>	<b>130</b>	<b>158</b>

DK/Refused/Missing responses less than 1 percent are not reported.

The most prevalent markets were permanent ADMARC markets which offer opportunities for farmers to sell select agricultural products (e.g., cotton, rice, groundnuts, beans, soy, pigeon peas and maize). Fewer than half of the communities hosted a large weekly market and fewer still reported having a daily market. Average distance to the closest daily, weekly, or ADMARC market ranged from 7.4 to 17.0 km; however distance to the closest location to purchase common medicines was 2.3 km and 1.6 km, for treatment and comparison sites respectively.

The average distance to a government primary school was less than 3 km on average. As expected, government secondary schools were less common and required on average, traveling 15-18 km. Community day secondary schools were more readily accessible, on average only 7-8 km away. Few communities reported having a private secondary school (10 percent) and fewer than 10 percent reported a private primary school.

Electricity, piped water and landline telephone services were extremely rare in the interviewed communities, both in treatment and comparison sites.

Access to health services in rural Malawi is challenging, with 30-35 percent of the population living more than 8 km from a health center.<sup>29</sup> To improve access, the Government of Malawi trained salaried-HSAs to host VHCs in rural communities. These VHCs are not typically brick-and-mortar venues, rather they are often open-air gatherings held 1-3 days per week to provide access to basic maternal and child health services in communities where access to a formal health center is difficult. In the study sample, just over 80 percent of communities in both the treatment and comparison groups did not have a health center and just under 80 percent reported not having a VHC either (Table 12.2).

**Table 12.2. Health facilities and personnel**

Facilities and personnel	Treatment	Comparison
<b>Health Services in the village</b>		
<b>Health clinic in the village</b>		
Yes	16.2	17.1
No	83.8	82.9
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Village health clinic in the village</b>		
Yes	22.3	25.3
No	77.7	74.7
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Health surveillance assistant for this village</b>		
Yes	93.1	87.5
No	6.9	12.5
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Distance to nearest health clinic (km)</b>	10.0	7.6
<b>Nurse, midwife, or medical assistant availability in the nearest health clinic</b>		
Always available	80.8	85.4
Sometimes available	18.5	14.6
Never available	0.8	0.0
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Satisfaction with the quality of the nearest health clinic</b>		
Very satisfied	9.2	9.5
Quite satisfied	26.2	20.3
Neither satisfied nor dissatisfied	32.3	25.9
Quite dissatisfied	23.8	20.3
Very dissatisfied	8.5	24.1
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Distance to nearest health facility where there is a medical doctor or clinical officer (km)</b>	21.9	21.2
<b>Facility type where nearest doctor works</b>		
Government facility	73.1	72.8
Religious facility	23.8	25.9
Private facility	3.1	1.3
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of villages</b>	<b>130</b>	<b>158</b>

DK/Refused/Missing responses less than 1 percent are not reported.

<sup>29</sup> Nsona H, Mtimuni A, Daelmans B, Callaghan-Koru JA, Gilroy K, Mgalula, L, Kachule T, Zamasiya T. (2012). Scaling Up Integrated Community Case Management of Childhood Illness: Update from Malawi. The American Journal of Tropical Medicine and Hygiene, 87(5 Suppl), 54–60.

However the majority of communities reported having an HSA work in the community, 93.1 percent and 87.5 percent in treatment and comparison respectively. Notably, only 77.8 percent of HSAs in the treatment group communities reported having a drug box, compared to 91.4 percent in the comparison group (data not shown). The average distance to the nearest health center was 10 km for the treatment group and 7.6 km for the comparison group. Trained health staff was more routinely available in the facilities nearest to the comparison communities. Less than 10 percent of respondents in either the treatment or comparison communities reported feeling very satisfied with the nearest health clinic. Respondents in almost one-quarter of comparison group communities (24.1 percent) reported feeling very dissatisfied with services at the nearest health clinic, compared to 8.5 percent of respondents from communities in the treatment group. Again, these findings should be interpreted with caution due to the small number of communities interviewed and the subjective measure of service quality in a group interview versus individual experience.

Distance to the nearest facility with a medical doctor was relatively equal, approximately 21 km, for both treatment and comparison communities. Ownership of the nearest facility with a medical doctor was also equally distributed; approximately 73 percent in both treatment and comparison categories were government owned and approximately a quarter were religiously affiliated.

Over 20 percent of comparison communities reported access to nutrition education or counseling and supplemental food programs for malnourished children, while fewer than 10 percent of the treatment communities reported similar activities (Table 12.3). In particular, supplemental food programs were reported in 21.5 percent of comparison communities and in 3.8 percent of treatment communities. Both groups have similar access to programs that provide care for chronically ill people and subsidized bed nets.

**Table 12.3. Community programs**

Community programs	Treatment	Comparison
<b>Insecticide treated bed nets free or at low cost</b>		
Yes	50.8	51.3
No	49.2	48.7
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Nutrition education or counseling</b>		
Yes	7.7	24.7
No	90.8	75.3
Don't know/Missing	1.5	0.0
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Supplemental food for malnourished children</b>		
Yes	3.8	21.5
No	96.2	77.8
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Care and support to chronically ill people (i.e., those with HIV/AIDS or TB)</b>		
Yes	17.7	16.5
No	82.3	83.5
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Support services for chronically ill people*</b>		
Medical care and medicine	8.9	9.2
Cash grants	2.1	0
Food or other in-kind gifts	6.8	4.6
Support and care for orphaned children	3.7	2.6
Other	0.5	2.6
<b>Number of villages</b>	<b>130</b>	<b>158</b>

\* Multiple responses possible, percentages will not sum to 100 percent.

DK/Refused/Missing responses less than 1 percent are not reported.

Per the community survey, the majority of villages reported receiving too little rain that started late in the season and ended too early (Table 12.4). Although relatively few communities in either the treatment or comparison group reported irrigation schemes (13.8 percent and 12.0 percent, respectively), community members participate in them differently. In 47.4 percent of the comparison communities almost all farmers participated in irrigation schemes, while only 11.1 percent of treatment communities had almost complete saturation.

**Table 12.4. Water resources in community**

Resources	Treatment	Comparison
<b>Rainfall last rainy season</b>		
<b>Amount of rain in last rainy season</b>		
Too much	7.7	11.4
Right amount	10.8	22.2
Too little	80.8	66.5
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Timing of rainy season commencement</b>		
Too early	18.5	13.3
Right time	12.3	23.4
Too late	69.2	63.3
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Timing of rainy season conclusion</b>		
Too early	83.1	72.8
Right time	12.3	22.2
Too late	4.6	5.1
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Irrigation</b>		
<b>Irrigation scheme in community</b>		
Yes	13.8	12.0
No	86.2	88.0
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of villages</b>	<b>130</b>	<b>158</b>
<b>In communities with irrigation schemes, proportion of farmers farming in irrigation scheme</b>		
Almost none	11.1	5.3
1/4	50.0	31.6
1/2	0.0	10.5
3/4	27.8	5.3
Almost all	11.1	47.4
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of villages with irrigation</b>	<b>18</b>	<b>19</b>

In almost all treatment and comparison communities, almost no community land is in the bush or the forest, and almost none is in an estate (Table 12.5). Approximately half of the communities reported paying the headman when they buy or sell land. Twenty-five percent of treatment communities reported being granted access to communal land, while only 15.8 percent of the comparison group communities did the same.

**Table 12.5. Land resources in community**

Resources	Treatment	Comparison
<b>Land</b>		
<b>Share of community land in bush</b>		
Almost none	85.4	77.2
1/4	10.8	17.1
1/2	1.5	3.2
3/4	2.3	1.3
Almost all	0.0	1.3
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Share of community land in forest and not used for agriculture</b>		
Almost none	80.8	86.7
1/4	18.5	12.0
1/2	0.8	1.3
3/4	0.0	0.0
Almost all	0.0	0.0
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Share of agricultural community land is in an estate?</b>		
Almost none	93.1	89.9
1/4	3.8	4.4
1/2	2.3	1.9
3/4	0.0	1.3
Almost all	0.8	2.5
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Residents pay village headman if they:</b>		
<b>Buy land</b>		
Yes	51.5	47.5
Waived if HH in need	0.8	0.0
No	39.2	29.7
Don't know/Missing	8.5	22.8
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Sell land</b>		
Yes	54.6	46.2
Waived if HH in need	0.8	0.0
No	36.9	31.0
Don't know/Missing	7.7	22.8
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Are granted access to communal land</b>		
Yes	25.4	15.8
Waived if HH in need	0.0	0.0
No	67.7	64.6
Don't know/Missing	6.9	19.6
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of villages</b>	<b>130</b>	<b>158</b>

DK/Refused/Missing responses less than 1 percent are not reported.

NASFAM is active in 47.7 percent of treatment communities, compared to only 31.6 percent of comparison communities; while FUM was mentioned by less than two percent of the comparison sites only (Table 12.6). Almost 30 percent of comparison communities and 22.3 percent of comparison communities reported another active farmer's group, the most common being Mardef, Limbs Leaf and Alliance One. Among those communities with active farmer's groups, approximately half of the groups in both the treatment and comparison group have been active for less than one year. Membership in farmer's groups is relatively low in both treatment and comparison groups, though INVC projections include enrolling more farmers each season. In 43.8 percent of treatment villages with farmers groups, almost no farmers are members of a farmer's group, compared to the 57.0 percent of comparison villages with farmers groups wherein almost no farmers are members.

**Table 12.6. Agricultural resources in community**

Agriculture resources	Treatment	Comparison
<b>Resources</b>		
<b>Resident assistant agricultural development officer</b>		
Yes	27.7	22.8
No	72.3	77.2
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Local warehouse in community to store crops prior to sale</b>		
Yes	3.8	2.5
No	96.2	97.5
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Farmers' clubs, groups, or associations active in community</b>		
FUM	0.0	1.9
NASFAM	47.7	31.6
Other	22.3	29.7
Don't Know/Missing	30.0	36.7
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of villages</b>	<b>130</b>	<b>158</b>
<b>Among communities with farmers' clubs/groups/associations</b>		
<b>Years the club, group, or association has been active</b>		
Less than 1 year	45.4	46.2
1-3 years	29.2	36.1
4-5 years	14.6	12.0
More than 5 years	10.8	5.7
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Proportion of farmers who are members</b>		
Almost none	43.8	57.0
1/4	38.5	29.7
1/2	5.4	7.6
3/4	4.6	2.5
Almost all	7.7	3.2
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Number of villages</b>	<b>91</b>	<b>100</b>

DK/Refused/Missing responses less than 1 percent are not reported.

Daily wages for male casual laborers averaged 1,214.39 MWK in treatment communities and 901.68 MWK in comparison communities. Daily wages for female casual laborers averaged 662.66 MWK in treatment communities and 624.84 MWK in comparison communities (Table 12.7). Children under age 16 work for money in 71.5 percent of treatment group communities and in 58.2 percent of comparison group communities.

**Table 12.7. Labor in community**

<b>Agriculture labor</b>	<b>Treatment</b>	<b>Comparison</b>
<b>Average daily wage for casual labor this season (MWK)</b>		
Male	1,214.39	901.68
Female	662.66	624.84
<b>Children under age 16 work for money in this community</b>		
Yes	71.5	58.2
No	27.7	41.8
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Proportion of children here who sometimes work for money</b>		
Almost none	10.8	7.6
1/4	44.1	42.4
1/2	11.8	18.5
3/4	18.3	15.2
Almost all	15.1	16.3
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>Average daily wage for children doing casual labor (MWK)</b>	<b>382.62</b>	<b>430.22</b>
<b>Number of villages</b>	<b>130</b>	<b>158</b>

DK/Refused/Missing responses less than 1 percent are not reported.

A large majority of communities interviewed experienced livestock diseases and crop diseases or pests in the past five years with little demonstrable improvement in the past one year (Table 12.8). One third of the sites battled human epidemics and almost three-quarters of sites faced a sharp change in prices in the past year. These negative shocks were reported equally across treatment and comparison communities. Overall, treatment and comparison groups report similar rates of positive economic shocks.

**Table 12.8. Community economic shocks in past year and five years**

Shocks	Past year		Past five years	
	Treatment	Comparison	Treatment	Comparison
<b>Negative economic shocks*</b>				
Drought	16.9	9.5	30.0	24.1
Flood	3.1	0.6	4.6	3.8
Crop disease/pests	50.0	63.9	62.3	77.2
Livestock disease	90.0	88.6	94.6	93.0
Human epidemic disease	33.1	33.5	39.2	43.0
Sharp change in prices	71.5	75.3	83.1	84.8
Massive job lay-offs	11.5	6.3	16.2	11.4
Loss of key social services	16.2	13.3	24.6	21.5
Power outages	0.8	10.8	0.8	10.8
<b>Positive economic shocks*</b>				
New employment opportunity	5.4	3.2	6.2	5.1
New health facility	0.8	5.7	3.1	8.9
New road	4.6	11.4	6.9	15.8
New school	6.2	15.2	10.0	16.5
On-grid electricity	0.8	3.2	1.5	3.2
Off-grid electricity	18.5	14.6	20.0	20.9
Improved transportation	7.7	10.8	14.6	15.8
Development program	22.3	24.1	28.5	29.1
Other	2.3	5.7	2.3	7.6
<b>Number of villages</b>	<b>130</b>	<b>158</b>	<b>130</b>	<b>158</b>

\* Multiple responses possible, percentages will not sum to 100 percent.

DK/Refused/Missing responses less than 1 percent are not reported.

## 13. Conclusions

The Malawi INVC impact evaluation seeks to measure the impact on the nutritional status of children, attributable to integrating a nutrition component into VC activities. This survey established baseline indicators for background characteristics, primary and secondary outcomes, and exposure to project or similar interventions in both the treatment and comparison groups.

### 13.1 Key Outcomes

The INVC project aims to improve household food security and nutrition, and reduce poverty by working with the “poor with assets” to diversify and improve agricultural production of legumes in Malawi. At baseline, we found high prevalence of stunting; over 40 percent of all children under 3 years of age surveyed. Moreover, exclusive breastfeeding among those 0-5 months of age was less than 70 percent, and among children 6-23 months of age only 13.4 percent of those in the treatment group and 10.4 percent in the comparison group met the recommended minimum acceptable diet. Overall household hunger was reported as moderate or severe among 31.4 percent of the treatment and 27.0 percent of the comparison group. Over one-half of the study population was living below the national poverty line and one-quarter were below the extreme poverty line.

As expected, over 90 percent of the sample reported farming during the past rainy season and on average between 0.87 and 1.03 hectares were farmed. The primary crop was maize although almost one-half of the farmers reported growing groundnuts and over one-third reported growing soy. Surprisingly, fewer than 13 percent of the households reported participating in a farmer’s club although over one-third reported receiving some type of assistance or information regarding producing, marketing, or consuming groundnuts and/or soy.

### 13.2 Balance across Evaluation Groups

Tests for balance at baseline between treatment and comparison groups found no significant differences between the groups for the primary indicators for children, including stunting, mean length, exclusive breastfeeding, minimum acceptable diet, vitamin A receipt and facility growth monitoring. Dietary diversity for WRA was statistically although not meaningfully different between groups, 3.1 versus 3.0 food groups among treatment and comparison groups respectively, and use of health services among women was comparable. Prevalence of household hunger was higher in the treatment group yet poverty measures were not statistically different across the populations. Lastly, household agricultural production and sales was higher in the comparison group. As noted in chapter 5, significant and substantively meaningful differences at baseline for select intermediary outcomes along the causal pathway may have implications for key outcomes over time. Recording these differences at baseline

highlights the importance of tracking these indicators and controlling for them at endline for identifying the impact of the nutrition interventions.

One notable difference across evaluation groups was the district of residence for the household. In the treatment group, more households were residents in Lilongwe versus Mchinji, 60.7 percent and 39.3 percent respectively. While in the comparison group, the reverse was true. Fewer households were residents from Lilongwe versus Mchinji, 46.2 percent and 53.8 percent respectively. Two factors possibly contributed to this imbalance across study groups by district of residence. First, at the time of randomization, the GAC were stratified by VC partner rather than by district to account for the possible different implementation plans for FUM and NASFAM. The assignment of GACs, however, was balanced at baseline by VC partner and by district. The second factor was the random assignment of treatment status at the GAC-level which was not weighted by the underlying population size. The number of villages per GAC and the number of households per village varied considerably over the sample, including variation between districts and VC groups. Following the exclusion of the contaminated sites, the resulting distribution of households by VC implementing partner in the treatment group was similar to the distribution in the comparison group. However, the distribution of households by district of residence in the treatment group was not similar to that among the comparison group. According to the Malawi PBS, baseline differences in stunting and poverty were seen between Lilongwe and Mchinji; however we did not find these same differences across our treatment and comparison groups despite the district imbalance.

### 13.3 Exposure to Interventions

Baseline results indicate very modest participation in either a FUM or NASFAM farmers' club; fewer than 15 percent of households in the sample reported participating in a club despite initiation of VC activities by the implementing partners during the previous year. This low participation rate came as a surprise given that only villages identified by the GACs as having at least one farmer resident participating in a club were deemed eligible for inclusion in the study. There are a few possible reasons for this low participation. First, the VC program inclusion criteria was not specific to farmer households with children under 3 years of age, yet our study sample was limited to households with young children. It might be that households with young children were less likely to join a farmer's club. Second, scale-up of VC club formation and activities may be slower than originally predicted. The first year of engagement is primarily sensitization to the agricultural interventions and VC partners anticipate higher engagement over the life of project. Third, the wording in the questionnaire may have missed farmers who were active during the previous growing season but did not consider themselves members if interviewed between growing seasons. Changes to the questionnaire to improve understanding yet maintain comparability to baseline data, will be explored at endline.

For the nutrition component, a small cohort, approximately 5 percent, of caregivers reported participation in a community care group with a slightly higher percentage reporting visits from a community care group leader in the last 12 months. Ideally, exposure to CCG activities at baseline would be negligent but the use of CCGs is a nationally endorsed strategy so involvement of CCGs outside of INVC groups is possible. Analysis of this small exposure may be included in the endline analysis to explore any potential implications for the evaluation's findings.

### 13.4 Implications for the Impact Evaluation

As with any study, there are risks that may threaten the impact evaluation and the validity of the results. Non-compliance with the evaluation design was one potential threat that proved problematic on two fronts. Despite the best intentions of the INVC project and partners, following baseline data collection it was discovered that approximately one-third of the study sites had been contaminated by unplanned expansion of the nutrition work. The best solution was to eliminate these contaminated sites from the analysis, thereby reducing the sample size.

The second challenge to compliance was the low coverage of the VC interventions as measured by VC group participation among survey respondents. One implication of this low participation and the loss of survey sample due to contamination is that we will not be able to measure the impact of the program among VC direct beneficiaries if VC participation remains low, as our sample of analysis will be too small. Evaluating the program impact of nutrition interventions at the community level among the treatment (VC and Nutrition) group may also be compromised if the coverage of the VC interventions is differential by treatment and comparison group. That is, if we have high coverage in one group and low coverage in the other group then it will be more difficult to isolate the effect of the added nutrition component. However, at baseline we found that participation in a farmer's club was balanced across study groups. It will be important to explore reasons for participation and non-participation during the qualitative data collection as well as track program implementation more closely over the study period.

Failure of the randomization was another potential threat that proved problematic as evidenced from the balance test failure on over 30 percent of the tested variables in the uncontaminated sample. The results of the balance testing overall reinforce the decision to employ a DID with fixed effects approach for estimating program effects. This strategy will control for both observed and unobserved time invariant differences between households in treatment and comparison groups.

### 13.5 Next Steps

Endline quantitative data collection is planned for 2017. A cross-section of households from the same study sites will be surveyed. Additionally, the panel of households with children under 2 years of age selected from the baseline sample will be resurveyed to measure changes in

mean length. The DID with fixed effects approach will be used to compare baseline and endline differences in targeted outcomes between the treatment and comparison groups.

Complementing the quantitative study component is the qualitative data collection and analysis. Ongoing collection of most significant change stories are targeting VC participants and non-participants to elicit stories of how the nutrition interventions alone or in conjunction with VC activities have made a difference for some of these families. Furthermore at endline individual in-depth interviews will probe regarding decisions to join farmer's clubs and community care groups, to help us understand the benefits and drawbacks of participation from the individual's perspective.

Finally, for the cost-effectiveness tracking and analysis, discussions are underway to identify and allocate appropriate program expenditures down to the community care group and the farmer's club. This level of expenditure tracking and project implementation monitoring will supplement our understanding of the project's true coverage.

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## Appendixes

### A. Sampling Weights

This appendix describes the calculation of design and sampling weights for final sample for the impact evaluation of the Integrating Nutrition in Value Chains (INVC) program in Malawi. More details of the sampling design are provided in section 3.3 of the report. The impact evaluation is based on a difference-in-differences (DID) quasi-experimental design that will compare changes over time in the treatment group with changes in the comparison (or control) group.

The Malawi impact evaluation baseline survey has a stratified two-stage sampling design. The first stage involved selection of villages within Group Action Committees (GACs) in each district. The second stage involved household selection.

#### *Design Weights*

For the INVC program, 54 GACs without nutrition interventions in Lilongwe and Mchinji were selected and then randomly assigned to either treatment (VC+Nutrition) or comparison group (VC-Only), with 27 GACs per group. Each GAC covers one or more villages. For the Malawi impact evaluation baseline survey, in the first stage of sampling all villages within each GAC (stratum) were selected. In the second stage of sampling, within each village (cluster), households with at least one child under 3 years old comprised the sampling frame. Up to 20 households per village were sampled (range: 1-20), and all children under 3 in selected households were included.

Design weights were calculated based on the separate sampling probabilities for each sampling stage and for each cluster:

$P_{1hi}$  = first-stage sampling probability of the  $i$ -th cluster (village) in stratum  $h$  (treatment or comparison group).

$P_{2hi}$  = second-stage sampling probability within the  $i$ -th cluster (household selection).

Because all eligible villages within the 54 GAC in Lilongwe and Mchinji were selected, the probability of selecting cluster  $i$  in the sample  $P_{1hi}$  is equal to 1.

The second-stage probability of selecting a household in cluster  $i$  is:

$$P_{2hi} = \frac{n_{hi}}{L_{hi}}$$

where:

$n_{hi}$  = number of selected sample households for the  $i$ -th sample cluster in stratum  $h$ .

$L_{hi}$  = number of eligible households listed in the household listing for the  $i$ -th sample cluster in stratum  $h$ .

The overall selection probability of each household in cluster  $i$  of stratum  $h$  is the product of the selection probabilities of the two stages:

$$P_{hi} = P_{1hi} \times P_{2hi} = 1 \times \frac{n_{hi}}{L_{hi}} = \frac{n_{hi}}{L_{hi}}$$

The design weight for each household in cluster  $i$  of district  $h$  is the inverse of its overall selection probability:

$$W_{hi} = \frac{1}{P_{1hi} \times P_{2hi}} = \frac{1}{1 \times P_{2hi}} = \frac{L_{hi}}{n_{hi}}$$

### Sampling Weights

The sampling weights were calculated using the design weights corrected for nonresponse within each of the selected clusters. Response rates were calculated at the cluster level as ratios of the number of interviewed units over the number of sampled units, where units could be household or individual (woman or child).

The household sampling weight was calculated by dividing the household design weight by the household response rate.

Individual sampling weights were calculated by dividing the household sampling weight by the individual response rates. Because the eligible respondents and response rates varied by module for women and caregivers for each module in the individual questionnaire, separate individual sampling weights were calculated for women by module in the questionnaire. For this same reason, separate individual sampling weights were calculated for children by age group and applied to the population of interest for each table or indicator, as necessary. For example, an individual sampling weight was calculated specifically for infants under 6 months old and applied when estimating the rate of exclusive breastfeeding, which is only of interest for that age group. Separate individual sampling weights were calculated for: children under 3 years, children under 3 years with anthropometric data, children under 2 years, children between 6-23 months, children between 6-35 months, and children under 6 months. It is important to notice that, as indicated in Table 4.1 individual response rates for these subgroups were very high, above 99 percent on average.

## B. Balance between Treatment and Comparison Populations

**Table B.1. Balance between treatment and comparison populations**

Indicators	Treatment mean	Comparison mean	Mean diff	Diff SE	p-value
<b>Under-nutrition</b>					
Prevalence of stunted children under 3 years of age	43.8	41.6	-2.2	1.9	0.25
Prevalence of underweight children under 3 years of age	13.9	12.9	-1.0	0.7	0.19
Prevalence of wasted children under 3 years of age	2.5	2.1	-0.4	0.4	0.23
Mean length of children under 2 years of age (cm)	70.0	69.6	0.4	0.3	0.15
<b>Food consumption</b>					
Mean number of food groups consumed by WRA	3.1	3.0	0.1	0.0	0.01
Prevalence of Exclusive breastfeeding of children under 6 months of age	64.3	67.8	3.5	3.1	0.26
Prevalence of children 6-23 months receiving a MAD	13.4	10.4	-3.0	1.8	0.09
<b>Food security</b>					
Prevalence of households with moderate or severe hunger	31.4	27.0	-4.4	1.8	0.01
Daily per capita expenditure for food (MWK)	170.70	166.54	-4.16	4.4	0.35
Percentage of daily per capita expenditure on food	46.9	46.8	-0.1	0.4	0.73
<b>Nutrition awareness (among caregivers)</b>					
Know recommendation for exclusively breastfeeding	72.0	70.2	-1.8	1.1	0.11
Know recommendation that pregnant women should eat more food, more protein-rich food and more iron-rich food	28.6	32.2	3.6	1.7	0.04
Know four key times when hand washing is recommended	41.9	46.4	4.5	1.0	0.00
<b>Use of health services by women and children</b>					
First ANC visit during first trimester of last birth	16.6	17.3	0.7	0.9	0.46
Last birth delivered at a facility	90.1	92.3	2.2	2.6	0.11
Vitamin A in past 6 months among 0-35 month olds	82.1	83.5	1.4	1.0	0.15
Facility growth monitoring visit in past 12 months among children 0-35 months	70.8	68.5	-2.3	1.7	0.17
<b>Poverty</b>					
Percent of people living on less than \$1.25 per day	40.5	42.0	-1.5	1.7	0.40
Percent of people living below the total national poverty line	53.8	55.2	-1.4	2.4	0.27
Daily per capita expenditures, mean (MWK)	333.92	326.31	7.61	8.7	0.17

**Table B.1. Balance between treatment and comparison populations (continued)**

Indicators	Treatment mean	Comparison mean	Mean diff	Diff SE	p-value
<b>Group affiliations</b>					
Households participating in a Farmer's Group	12.8	11.2	-1.5	1.5	0.29
Caregivers participating in a Community Care Group	4.8	5.0	0.2	0.4	0.68
<b>Agricultural activity by household</b>					
Area cultivated last season for groundnuts (mean ha)	0.33	0.32	-0.00	0.0	0.72
Volume of groundnuts cultivated (kg)	318.0	288.6	-29.4	17.9	0.10
Mean land productivity for groundnuts (kg per ha)	1,059.2	996.6	-62.6	50.0	0.21
Volume of groundnuts sold (kg)	209.8	226.6	16.8	13.4	0.21
Percent groundnut harvest sold last season	55.0	59.1	4.0	1.0	0.00
Mean value of groundnut harvest sold (mean MWK)	15,174.32	15,640.50	466.19	1,579.2	0.77
Mean value of groundnut harvest sold per kg (MWK/kg)	84.00	103.44	19.44	8.4	0.02
Area cultivated last season for soy (mean ha)	0.25	0.28	0.03	0.0	0.00
Volume of soy cultivated (kg)	105.2	132.4	34.8	8.0	0.00
Mean land productivity for soy (kg per ha)	453.6	526.9	73.3	20.5	0.00
Volume of soy sold (kg)	107.0	122.9	16.3	9.1	0.07
Percent soy sold last season	75.5	78.9	3.4	1.5	0.02
Mean value of soy harvest sold (mean MWK)	14,654.02	15,468.55	814.53	1,129.9	0.47
Mean value of groundnut harvest sold per kg (MWK/kg)	213.49	139.25	-74.24	46.9	0.11
<b>Household characteristics</b>					
<b>Household type</b>					
Adult male and female	82.9	84.8	1.9	1.6	0.21
Adult female only	16.5	14.8	-1.7	1.5	0.26
<b>Household size</b>					
Average household size	4.9	4.8	-0.1	0.1	0.41
Average number of adults age 18-64	2.0	2.0	0.0	0.0	0.88
Average number of elderly age 65 and older	0.0	0.0	0.0	0.0	0.29
Average number of children under 3	1.1	1.1	0.0	0.0	0.03
Average number of children under 2	0.7	0.8	0.0	0.0	0.32
<b>District</b>					
Lilongwe	60.7	46.2	-14.5	4.6	0.00
Mchinji	39.3	53.8	14.5	4.6	0.00

**Table B.1. Balance between treatment and comparison populations (continued)**

Indicators	Treatment mean	Comparison mean	Mean diff	Diff SE	p-value
<b>Socio-demographic characteristics of head of household</b>					
<b>Sex</b>					
Male	54.1	53.7	-0.4	1.6	0.79
<b>Age</b>					
15-19 years	2.9	3.2	0.3	0.6	0.58
20-29 years	49.7	51.8	2.1	1.2	0.07
30-39 years	33.5	32.6	-0.9	1.2	0.45
40-49 years	11.2	8.7	-2.5	0.7	0.00
50 and older	2.7	3.8	1.1	0.7	0.11
<b>Literacy</b>					
Cannot read and write	24.5	26.5	2.0	1.7	0.27
Can read and write	68.8	66.7	-2.1	1.8	0.27
<b>Highest grade of education completed</b>					
No formal schooling	11.8	13.5	1.7	0.7	0.02
Standard 1-4	28.8	27.2	-1.6	1.1	0.15
Standard 5-8	41.4	40.7	-0.7	1.2	0.56
Secondary 1-2	9.4	8.3	-1.1	0.9	0.23
Secondary 3-4	7.8	8.2	0.4	1.2	0.72
<b>Occupation</b>					
Farmer	79.8	78.3	-1.5	2.4	0.56
<b>Household cultivation</b>					
Total area of plots owned or cultivated (ha)	1.0	0.9	0.2	0.0	0.00
<b>Dwelling characteristics</b>					
<b>Home ownership</b>					
Own or being purchased	88.7	82.4	-6.3	4.1	0.12
Free, authorized and unauthorized	9.5	9.6	0.1	1.0	0.93
Rented	1.3	7.4	6.1	4.9	0.21
<b>Type of roof</b>					
Grass thatched	78.7	76.1	-2.6	4.1	0.52
Iron Sheets	21.1	23.7	2.6	4.1	0.52
Other	0.2	0.2	0.0	0.1	0.94

**Table B.1. Balance between treatment and comparison populations (continued)**

Indicators	Treatment mean	Comparison mean	Mean diff	Diff SE	p-value
<b>Type of exterior walls</b>					
Mud/Compacted Earth	13.8	14.5	0.7	1.6	0.68
Unfired Bricks	42.0	37.8	-4.2	1.3	0.00
Fired Bricks	42.8	46	3.2	2.4	0.18
Other	1.5	1.7	0.2	0.3	0.38
<b>Type of floor</b>					
Sand/Compacted Earth	92	88.4	-3.6	4.1	0.38
Smoothed Cement	8	11.6	3.6	4.1	0.38
Other	0.0	0.0	0.0	0.0	0.75
<b>Number of rooms for sleeping</b>					
Average Number	2.0	2.0	-0.01	0.0	0.61
<b>Utilities</b>					
Working electricity	0.6	2.3	1.7	1.2	0.15
Number of working cell phones	1.3	1.3	0.0		0.39
<b>Main source of lighting fuel</b>					
Battery/Dry cell	78.4	76.8	-1.6	2.0	0.42
Firewood	9.5	13.7	4.3	1.2	0.00
<b>Household cooking conditions</b>					
<b>Main cooking location</b>					
Kitchen separate from primary dwelling	59.4	61.5	2.1	1.1	0.07
Fully outdoors	36.5	32.7	-3.7	1.1	0.00
<b>Type of cooking stove</b>					
Three stone fire	97.8	96.6	-1.2	0.7	0.10
<b>Main source of cooking fuel</b>					
Firewood	93.8	94.1	0.3	1.0	0.81
<b>Water, sanitation, and environment characteristics</b>					
<b>Main source of drinking water</b>					
Tube well/borehole	79.4	84.3	5.0	1.6	0.00
Protected well/springs	6.5	4.3	-2.2	0.6	0.00
Unprotected well/springs	10.6	8.1	-2.5	1.2	0.04
<b>Household treatment of drinking water</b>					
No Treatment	79.8	82.1	2.3	0.9	0.02

**Table B.1. Balance between treatment and comparison populations (continued)**

Indicators	Treatment mean	Comparison mean	Mean diff	Diff SE	p-value
<b>Toilet facility</b>					
Traditional pit latrine with roof	52.1	54.3	2.2	2.3	0.33
Traditional pit latrine with no roof	29.8	30.9	1.1	1.9	0.57
No toilet facility	16.8	14.3	-2.5	0.9	0.01
<b>Toilet use</b>					
For household members only	47.6	51.0	3.4	1.4	0.02
Other households use toilet of this household	28.6	27.2	-1.4	1.7	0.41
Household members use toilet of another household	21.5	20.4	-1.1	1.0	0.26
<b>Assets</b>					
<b>Household assets</b>					
Bed	13.3	14.1	0.8	1.7	0.66
Table	22.1	21.6	-0.5	2.1	0.82
Chair	25.7	27.4	1.7	2.1	0.42
Upholstered Chair	3.2	3.2	0.0	0.7	0.96
Cupboard	2.0	2.1	0.1	0.3	0.82
Mortar and Pestle	22.2	22.3	0.1	1.3	0.94
Iron	7.6	8.5	0.9	0.9	0.34
Radio	38.4	40.3	1.9	1.9	0.32
Television	2.2	4.2	2.0	1.5	0.18
Bicycle	51.0	48.5	-2.5	1.4	0.07
Motorcycle or Car	2.8	0.9	-1.9	0.4	0.00
Solar Panel	5.3	3.2	-2.1	0.5	0.00
<b>Farming assets</b>					
Hand hoe	95.6	95.6	0.0	0.4	0.96
Axe	38.6	37.3	-1.3	1.6	0.44
Panga Knife	50.7	50.4	-0.3	1.0	0.82
Sickle	36.8	37.2	0.4	1.7	0.84
Watering Can	45.8	42.6	-3.2	1.4	0.03
Ox Cart	5.6	2.8	-2.8	0.4	0.00
Cow – local zebu	3.9	2.2	-1.7	0.5	0.00
Cow – hybrid	0.5	0.4	-0.1	0.2	0.36
Bull/Ox	4.4	1.9	-2.5	0.5	0.00
Donkey/Mule/Horse	1.0	0.6	-0.4	0.2	0.02
Goat/Sheep	25.5	23.0	-2.5	1.3	0.06
Chickens/Guinea Fowl	43.0	49.6	6.6	1.7	0.00

**Table B.1. Balance between treatment and comparison populations (continued)**

Indicators	Treatment mean	Comparison mean	Mean diff	Diff SE	p-value
<b>Social safety nets</b>					
<b>Food</b>					
Vouchers or coupons to buy fertilizers or seeds	48.9	41.4	7.5	2.7	0.01
Free seed (for agriculture production)	10.5	10.3	0.3	0.8	0.75
Food/Cash-for-work program	10.5	8.2	2.3	1.1	0.03
Free maize	7.1	7.4	-0.3	1.0	0.77
Free food (other than maize)	5.0	6.5	-1.5	0.8	0.06
Free distribution of likuni phala to children and mothers (targeted nutrition program)	4.5	3.9	0.6	0.6	0.29
Supplementary feeding for malnourished children at nutritional rehabilitation unit	3.1	2.3	0.8	0.4	0.03
Inputs-for-work program	3.0	3.0	0.0	0.5	0.93
School feeding program	2.5	3.5	-0.9	0.5	0.04
<b>Education</b>					
Tertiary education loan scheme	0.2	0.2	0.0	0.1	0.99
Scholarships/bursaries for secondary education	0.1	0.5	-0.4	0.1	0.00
Scholarships for tertiary education (university scholarship, upgrading teachers)	0.1	0.3	-0.2	0.1	0.03
<b>Cash transfers/other</b>					
Community based childcare	9.2	6.5	2.7	0.9	0.00
Malawi Social Cash Transfer Program	0.9	1.5	-0.6	0.2	0.02
Direct cash transfers from other organizations (NGOs, development partners)	0.8	1.1	-0.3	0.2	0.16
Other	0.7	0.3	0.4	0.1	0.00
<b>Number of households</b>	<b>1,715</b>	<b>1,840</b>			

DK/Refused/Missing responses less than 1 percent are not reported.

## C. Obtaining the Conversion Factor for 2014 MWK to Constant 2010 USD

1. CPI, Malawi, 2005: 64.20 (2010 base year)<sup>30</sup>
2. CPI, Malawi, 2014: 206.71<sup>31</sup>
3. Conversion factor from 2014 MWK to 2005 MWK:  $64.20/206.71 = 0.310580$
4. Conversion factor PPP, for private consumption, MWK per US International Dollar, 2005: 56.922<sup>32</sup>
5. Conversion factor USD 2005 (PPP) per 2005 MWK:  $1/56.922 = 0.017568$
6. CPI, US, 2005: 100.00<sup>33</sup>
7. CPI, US, 2010: 111.6563<sup>34</sup>
8. Conversion factor from 2005 USD to 2010 USD:  $111.6563/100 = 1.116563$
9. Then, the conversion factor for 2014 MWK to constant 2010 US Dollars is:

$$0.310580 \times 0.017568 \times 1.116563 = 0.0060922$$

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<sup>30</sup> World Development Indicators, World Bank, *Financial Sector, Exchange rates & prices series*  
<http://databank.worldbank.org/data/views/variableSelection/selectvariables.aspx?source=world-development-indicators>.

<sup>31</sup> Ibid.

<sup>32</sup> World Development Indicators, World Bank, *Economic Policy & Debt, Purchasing Power Parity series*.  
<http://databank.worldbank.org/data/views/variableSelection/selectvariables.aspx?source=world-development-indicators>.

<sup>33</sup> World Development Indicators, World Bank, *Exchange Rates and Prices, Consumer Price Index series; 2005, base year*.

<sup>34</sup> Ibid.

## D. Updating National Poverty Lines to 2014

Two poverty lines were generated for the purpose of this study that includes the total poverty line and the extreme poverty line. The extreme poverty line is a national food poverty line. The total poverty line is a sum of the food poverty line and a non-food poverty line. These two national poverty lines were first generated by the Government of Malawi through the National Statistical Office (NSO) in 2004 in Malawi Kwacha (MWK) using a cost of basic needs approach as part of the Second Integrated Household Survey. They were then adjusted in 2011 as part of the Third Integrated Household Survey, and they underwent a further update in 2013 as part of the Third Integrated Household Panel Survey. National Consumer Price Indices (CPI) were used to conduct the updates. For purposes of this evaluation study, the poverty lines were also adjusted for inflation between 2013 and 2014, which was 23.8 percent. In order to be consistent with the update procedure adopted by the NSO, the two poverty lines were updated using the measure of overall inflation.

The following processes were used:

1. Extreme poverty line:<sup>35</sup> MWK 53,262.00 /year (MWK 145.92/day)
2. Total poverty line:<sup>36</sup> MWK 85,852.00 /year (MWK 235.21/day)
3. Consumer Price Index (CPI), Malawi, 2013:<sup>37</sup> 166.12
4. Consumer Price Index (CPI), Malawi, 2014:<sup>38</sup> 205.67

Extreme Poverty:  $MWK\ 145.92 * (205.67 / 166.12) = MWK\ 180.65$  per capita, per day

Total Poverty:  $MWK\ 235.21 * (205.67 / 166.12) = MWK\ 291.19$  per capita, per day

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<sup>35</sup> Republic of Malawi, National Statistical Office. Third Integrated Household Panel Survey, 2013. Zomba, Malawi.

<sup>36</sup> Ibid.

<sup>37</sup> Republic of Malawi, National Statistical Office. Consumer Price Index National 2014.

Available at: <http://www.nsomalawi.mw/latest-publications/consumer-price-indices/204-consumer-price-index-national-2014.html>

<sup>38</sup> Ibid.

## E. Converting USD 1.25 and USD 2.00 (2005 PPP) to 2014 Malawi Kwacha

The Malawi Kwacha (MWK) values of the two international poverty lines were calculated using the following formula:

$$Povline_{1.25} = \left[ PPP_{2005} \left( \frac{CPI_{current}}{CPI_{2005}} \right) \right] * 1.25$$

Where,  $Povline_{1.25}$  is the \$1.25-a-day line in MWK,  $PPP_{2005}$  is the purchasing power parity (PPP) for Malawi for 2005,  $CPI_{current}$ , and  $CPI_{2005}$  are consumer price indices for 2014 and 2005 respectively. The \$2-a-day line is similarly calculated.

Using the formula above, the MWK equivalents of the poverty lines were computed as follows:

1. Poverty line (USD, 2005 PPP): 1.25
2. Poverty line (USD, 2005 PPP): 2.00
3. PPP conversion factor for private consumption, MWK per US International Dollar 2005:<sup>39</sup> 56.922
4. CPI, Malawi, 2005:<sup>40</sup> 64.20
5. CPI, Malawi, 2014:<sup>41</sup> 206.71

The USD 1.25 (2005 PPP) poverty line in MWK 2014 is:  $((206.71/64.20) * 56.922) * 1.25 = 229.10$

The USD 2.00 (2005 PPP) poverty line in MWK 2014 is:  $((206.71/64.20) * 56.922) * 2.00 = 366.55$

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<sup>39</sup> World Development Indicators, World Bank, *Economic Policy & Debt, Purchasing Power Parity* series.  
<http://databank.worldbank.org/data/views/variableSelection/selectvariables.aspx?source=world-development-indicators>.

<sup>40</sup> World Development Indicators, World Bank, *Financial Sector, Exchange rates & prices* series  
<http://databank.worldbank.org/data/views/variableSelection/selectvariables.aspx?source=world-development-indicators>.

<sup>41</sup> Ibid.

## **F. Survey Instruments**

Attached as a separate document.