



# FEED THE FUTURE

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



## Feed the Future Kenya Zone of Influence Baseline Report May 2013



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## **Acknowledgements**

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While the baseline study was conducted on behalf of the USAID Kenya Mission, ABEO, any opinions expressed in the document do not necessarily represent USAID's views.

## **Executive Summary**

The Feed the Future (FTF) is the United States of America (US) government Global Hunger and Food Security Initiative (GHFSI), whose goal is to sustainably reduce hunger and poverty. In Kenya, the United States Agency for International Development (USAID) Kenya Mission has developed a multi-year FTF strategy to implement the Initiative. The Kenya FTF 2011-2015 strategy (FTFS) seeks to invest in transforming Kenya's agriculture through improved competitiveness of high-potential value chains and promotion of diversification into higher-return, on- and off-farm activities. The strategy also recognizes the importance of nutrition, and will strive to link agricultural sector transformation with improvement in nutrition.

The Kenya FTFS program of activities will pursue two objectives: (i) inclusive agricultural sector growth; and (ii) improved nutritional status of women and children. The activities will aim at improving agricultural enabling environment; expanding markets and trade; and improving productivity of targeted value chains; increasing the supply of agricultural commodities with important nutritional attributes; and, increasing household incomes.

Geographical area of focus by the Kenya FTFS, also known as zone of influence (ZOI), are high rainfall area 1 (HR1) and semi-arid area 2 (SA2), covering 22 Counties. The FTF ZOI is characterised by: high agricultural output; greatest number of rural poor; highest poverty density; low household incomes; highest number of malnourished children; and largest number of female heads of households, which, combined offer best opportunities for linking growth and poverty reduction.

The Kenya FTFS has a comprehensive Results Framework that clearly illustrates the intervention areas of focus and outlines intermediate and sub-intermediate results expected to be achieved by the interventions. The strategy's performance towards realization of the objectives will need to be measured from time to time using well defined indicators. It is for this reason that a population-based baseline survey (PBS) was conducted in the FTF ZOI to provide information about the current status of the indicators of interest and establish a benchmark for performance monitoring and future impact evaluation of the strategy.

The fifth National Sample Survey and Evaluation Programme (NASSEP V) household sample frame developed and maintained by the Kenya National Bureau of Statistics (KNBS), and a combination of stratified and multi-stage sampling methodology were used in selecting a sample of 2,625 households spread in 105 clusters. HR1 and SA2 were considered as strata and the sample allocated proportionately to the strata. Data collection was conducted between January and February 2013, and a total of 2,365 households (1,878 male and female adult; 361 female adult only; and 126 male adult only households), out of the number in the sample, participated in the survey.

The PBS instrument for the FTF ZOI provided in Volume 8 of the FTF M&E Guidance Series was adapted to the local context and used. The information collected included household consumption and expenditure; food consumption data on a select group of children

and women residing in the households; and decision making and access to productive assets by primary male and female decision makers residing in the households. The information collected were used to compute seven indicators of interest to the FTF, namely; prevalence of poverty (percent of people living on less than \$1.25/day); per capita expenditure; women's empowerment in agriculture index (WEAI); prevalence of households with moderate or severe hunger; prevalence of children 6-23 months receiving minimum acceptable diet; women's dietary diversity; and prevalence of exclusive breastfeeding of children under six months of age. While anthropometry information and prevalence of anaemia among children 0-59 months and women of reproductive age are also indicators of interest to the FTF, data on these indicators were not collected in this PBS on technical grounds, and baseline information on the indicators will be obtained from the Kenya National Micronutrient Survey (KNMS) conducted in 2011 by the Ministry of Public Health and Sanitation.

## **Baseline Results**

### *Household demographics*

Majority (73%) of primary respondents were female. The average age of the respondents was 44 years, with respondents in female adult only households being older (55 years). Overall, about 50 percent of primary respondents had primary 4-8 level of education. For female adult only households, 33 percent of the respondents had primary 4-8 level of education, while a higher percentage (41%) had less than primary education.

The mean number of total and female household members was 5.5 and 2.7, respectively. The number of older children (5-17 years) was higher than for younger children (0-5 years). On average, all the older children were reported to be attending school.

### *Dwelling characteristics, water and sanitation*

On average, surveyed households owned their main houses and had an average of about three (3) rooms. Majority (88%) of the households had houses roofed with corrugated iron sheets, over 60 percent had earth/mud walls and 70 percent had floors of earth/mud. Overall, the proportions of households with electricity, improved water source and sanitation facilities were 13.9, 54.5 and 14.5 percent, respectively. Firewood was the most commonly used cooking fuel, reported by nearly 92 percent of the households.

### *Consumption expenditure and poverty*

The mean per capita expenditure per day was USD 2, and it differed significantly among the three household types, with male only households having more than twice the per capita expenditure of male & female adults and female adult only households. Per capita expenditure across expenditure quartiles and deciles shows existence of wide disparity, with the top quartile and decile households spending significantly higher amounts than lowest quartiles and deciles. Food items occupied the largest share (over 55%) in household expenditure irrespective of household type. Expenditure shares for the different items differed significantly among the household types.

Using a poverty line of \$1.25 per person per day, 44.7 percent of individuals in the survey were poor, and the proportion differed significantly across household types, where it was comparatively lower in male adult only households. The depth of poverty, measured by the poverty gap index, was on average 0.14, and was significantly different among household types. Poverty prevalence, using national rural poverty line of KES 94.75 per person per day, averaged 47.1 percent, and the poverty gap index was 0.15. These figures compare well with the national poverty estimates by the Kenya National Bureau of Statistics (KNBS) in 2005, which were found to be, for prevalence, 45.9 percent (national) and 49.7 percent (rural), and, for depth, 0.175 (rural).

#### *Nutrition and household hunger*

About 49 percent of children less than six months were exclusively breastfed. According to the demographic and health survey (DHS) conducted in Kenya in 2008-2009, prevalence of exclusive breastfeeding among children less than six months was 32 percent. Approximately 27 percent of children 6-23 months of age received minimum acceptable diet. Prevalence of minimum acceptable diet was more favourable among female adult only households (51.4%) compared to male and female adult households (25.8%). About 74 and 30 percent of children 6-23 months received minimum feeding frequency and minimum dietary diversity, respectively.

For women of reproductive age (15-49 years), the mean dietary diversity score was only four (4); on a scale that represents nine (9) food groups. This mean is less than the midpoint of the highest possible score.

About 14 percent of all households had experienced moderate or severe hunger; 1.4 percent was in the severe category and 12.1 percent had experienced moderate hunger. Prevalence of moderate or severe hunger was greatest among female adult only households (17.4%).

#### *Women's Empowerment in Agriculture Index (WEAI)*

The WEAI was 0.797, which was a weighted average of the 5DE sub-index value of 0.785 and the GPI sub-index value of 0.909. About 37 percent of women were empowered. The 63 percent disempowered women had a mean empowerment score of 0.656. Gender parity in achieving the 5DE index showed men had significantly higher adequate achievements than women in all the indicators of empowerment, except group membership, and the differences were relatively higher for indicators related to workload, autonomy in production and speaking in public.

Decomposition of the 5DE index by dimension and indicator showed that the domains that contributed most to women's disempowerment were limited decision-making in agricultural production (30.6%), time burden (29.4%), and lack of control over resources (22%). The domains that contributed most to men's disempowerment were similar to those for women. Also, the configurations of men's deprivations in empowerment were not strikingly different from women's. The main difference was that while speaking in public contributed more to

women's disempowerment in the leadership domain, lack of group membership was more important for men.

Poverty status was significantly associated with empowerment for both men and women, where the proportion of empowered women and men was higher among non-poor than poor households. Household expenditure and asset levels were also significantly associated with empowerment, where the proportion of empowered women increased up the expenditure asset quartiles.

With respect to nutrition, women who were empowered had significantly greater dietary diversity. The percentage of empowered women was lower in households reporting higher hunger scales. Also, the proportion of children with minimum dietary diversity was higher for empowered than non-empowered women for all decision-making indicators.

#### *Relationship between age and education of primary respondent and nutrition*

Both age and education of primary respondent were not statistically related to young child feeding in terms of minimum dietary diversity and minimum acceptable diet for children 6-23 months of age. However, the relationship between education of primary respondent and household hunger showed that a higher percentage of primary respondents in households that reported higher hunger scales (moderate and severe hunger) were classified as having no formal education, less than primary education, while others had attained just primary education.

#### *Relationship between per capita expenditure and the FTF indicators*

Prevalence of households with moderate or severe hunger decreased up the quartiles of per capita expenditure, and differences across the quartiles were statistically significant. The proportion of children 6-23 months receiving minimum acceptable diet did not differ across expenditure quartiles, but differed significantly between the top and bottom expenditure deciles. Prevalence of exclusive breastfeeding differed significantly across expenditure quartiles, being highest in the top quartile and lowest in the second quartile. Women's dietary diversity score increased with increase in per capita expenditure and the inter quartile differences in diversity score were statistically significant. Women's empowerment in agriculture index (WEAI) generally increased up the expenditure quartiles.

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# **1. Background**

## **1.1. Feed The Future (FTF) Overview**

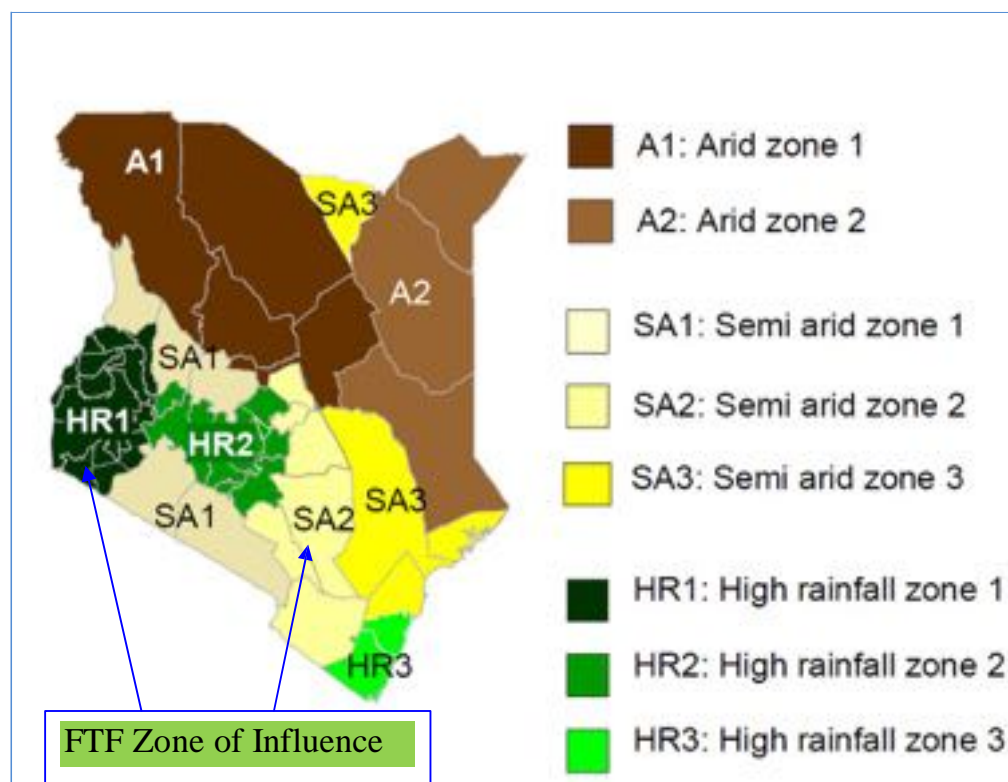
The Feed the Future (FTF) is the US government Global Hunger and Food Security Initiative (GHFSI), whose goal is to sustainably reduce hunger and poverty. It aims to do this by tackling their root causes and employing proven strategies for achieving large scale and lasting impact. In Kenya, the United States Agency for International Development (USAID) Kenya mission has developed a multi-year FTF strategy to implement the Initiative (USG, 2011). The Kenya FTF 2011-2015 strategy (FTFS) builds upon the experience and results of previous USAID programs, with its focus on innovation and finding and scaling up what works. It seeks to invest in transforming Kenya's agriculture through improved competitiveness of high-potential value chains and the promotion of diversification into higher-return, on- and off-farm activities. The strategy's activities will be aligned with the country's agricultural sector development plan. Areas of emphasis by the Kenya FTFS consist of partnership with other stakeholders in the sector, including other development partners and the private sector players to harmonize procedures, and encourage shared learning, resource leveraging and support to analytical work to inform policy and strengthen advocacy efforts. The strategy also recognizes the importance of nutrition, and will link agricultural sector transformation with improvement in nutrition. Success of the Kenya FTFS will be measured by its contribution to the achievement of the Millennium Development Goal (MDG) of halving the proportion of people living in extreme poverty and suffering from hunger by 2015.

## **1.2. FTF Zone of Influence (ZOI) Profile**

### **1.2.1. Boundaries and Underlying Rationale for ZOI Designation**

The geographical area of focus by the Kenya FTFS, also known as zone of influence (ZOI), are high rainfall area 1 (HR1) and semi-arid area 2 (SA2) (see Figure 1). The two regions span 22 Counties of Kenya. The following were considered in selecting these areas for FTF interventions a) number of poor households and severely malnourished children; b) volume of staple food production; c) ethnic diversity of the population. The two areas are characterised by: greatest agricultural output (kg of food per household) in their respective ecological zones; greatest number of rural poor; highest poverty density, especially in female-headed households; lowest incomes per household in the agricultural regions; highest number of malnourished children; and largest number of female heads of households. Because of these characteristics, the Kenya FTFS sees these regions offering best opportunities for linking growth and poverty reduction, and the investments reaching a more diverse set of ethnic groups.

**Figure 1: Kenya FTF Zones of Influence**



Source: USG, 2011

### 1.2.2. Strategic Objectives of FTF in the ZOI

The program of activities under the Kenya FTFS will pursue two objectives: (i) inclusive agricultural sector growth; and (ii) improved nutritional status of women and children. The two objectives are anchored on the hypotheses that: over the long run increased agricultural transformation that entails growth in competitive value chains as well as diversification within and outside agriculture will lead to reductions in poverty; and that undernutrition, which perpetuates the cycle of poverty through stunting cognitive development, must be addressed to achieve sustainability in Kenya's development efforts. In pursuit of objective (i), the Kenya FTFS activities will aim at improving agricultural enabling environment; expanding markets and trade; and improving productivity of selected value chains. For objective (ii), the strategy aims to work towards increasing the supply of agricultural commodities with important nutritional attributes; and increasing household incomes of the poor so they can afford to purchase more diverse and quality foods.

The Kenya FTFS will focus its farmer/household activities on production and post-harvest handling in the ZOI (HR1 and SA2) largely through the Kenya Agricultural Value Chain Enterprises (KAVES) Project. The Strategy's priority value chains in these regions include horticulture, dairy and maize (for HR1) and drought tolerant crops (e.g., sorghum/millet and root crop systems), horticulture, and drought-tolerant maize (for SA2). In addition, pulses, an

important source of plant protein, are widely grown in SA2 and will receive support alongside the priority value chains. However, given that some activities along value chain may be located outside the focus areas due to factors related to infrastructure and markets, some activities of in the Kenya FTFS activities beyond the farm/household may not necessarily be confined to the ZOI.

### 1.2.3. Demographics

The demographic profile in terms of population size of various age groups for women and children nationally and within the ZOI is presented in Table 1. The population in the ZOI represented about 48 percent of national population, and women of reproductive age in the ZOI were also 48 percent of the total number of women in this category nationally (Table 1). The number of children below five years in the ZOI was 51 percent of all children within this age category nationally.

**Table 1: Total, rural and urban population numbers nationally and within the ZOI**

	Population			
	National	HR1	ZOI SA2	Total ZOI
Total population	38,610,097	13,437,860	5,002,108	18,439,968
Rural	26,122,722	9,783,240	3,923,226	13,706,466
Urban	12,487,375	3,654,620	1,078,882	4,733,502
Total Households	8,767,954	2,864,801	1,135,978	4,000,779
Women of Reproductive Age (15-49 years)	9,375,784	3,288,768	1,181,188	4,469,956
Women of Reproductive Age (Rural)	5,863,055	2,432,514	904,867	3,337,381
Women of Reproductive Age (Urban)	3,512,729	856,198	276,321	1,132,519
Children 0-59 months	5,939,306	2,321,664	694,847	3,016,511
Males 0-59 months	3,000,439	1,160,032	351,010	1,511,042
Females 0-59 months	2,938,867	1,161,632	343,837	1,505,469
Children 12-59 months	4,717,369	1,831,096	555,617	2,386,713
Males 12-59 months	2,383,596	912,769	296,768	1,209,537
Females 12-59 months	2,333,773	918,327	258,849	1,177,176
Children less than 1 year	1,221,937	490,568	139,230	629,798
Males less than 1 year	616,843	247,263	70,154	317,417
Females less than 1 year	605,094	243,305	69,076	312,381
Children 0-23 months	2,280,015	921,227	262,110	1,183,337
Males 0-23 months	1,152,512	465,291	132,310	597,601
Females 0-23 months	1,127,503	455,936	129,800	585,736

Source: *Republic of Kenya, 2009*

### 1.3. Population-based (PBS) Indicators for the ZOI

The Kenya FTFS has a comprehensive Results Framework that clearly illustrates the intervention areas of focus and outlines the intermediate and sub-intermediate results expected to be achieved by the interventions. The Strategy's performance towards

achievement of the results will need to be measured from time to time using well defined indicators. The seven FTF<sup>1</sup> indicators collected through the PBS for the ZOI are presented in Table 2. Poverty prevalence in the ZOI was estimated as 44.7 percent, with household expenditure averaging USD 2 per capita per day, and was statistically different across gendered household types. The Women's Empowerment in Agriculture Index (WEAI), which is a weighted average of the 5DE (dimensions of empowerment) sub-index of 0.785 and the gender parity index (GPI) of 0.909, was 0.797.

Prevalence of households with moderate or severe hunger in the ZOI was 13.5 percent and differed significantly among household types, while women's dietary diversity (mean number of food groups consumed by women of reproductive age (15-49 years)) was 4.08. Prevalence of children 6-23 months receiving a minimum acceptable diet and exclusive breastfeeding of children below six months of age were 26 and 49 percent, respectively, and did not statistically differ between male and female children.

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<sup>1</sup> The 7 indicators do not include those expected to be computed based on the Kenya National Micronutrient Survey (KNMS) 2011 data

**Table 2: FTF ZOI PBS indicators**

<b>FTF FEEDBACK Indicator</b>	<b>N</b>	<b>Baseline Value</b>	<b>Standard Deviation/ Error</b>	<b>95% CI</b>	<b>DEFF</b>	<b>Source</b>	<b>Year collected</b>
	<b>Unweighted</b>	<b>Weighted</b>					
Prevalence of Poverty: Percent of people living on less than \$1.25/day	12900	44.7	2.1	4.1	22.2	PBS	2013
M&F (both male and female adults)	11284	45.4***	2.2	4.3	21.6	PBS	2013
MNF (male adult(s) only)	227	4.9***	2.5	4.9	2.8	PBS	2013
FNM (female adult(s) only)	1389	45.3***	2.9	5.8	4.9	PBS	2013
Per capita expenditures of USG targeted beneficiaries	12900	2.0	1.7	0.1	19.3	PBS	2013
M&F (both male and female adults)	11284	2.0***	1.6	0.1	20.9	PBS	2013
MNF (male adult(s) only)	227	4.6***	4.9	1.0	2.4	PBS	2013
FNM (female adult(s) only)	1389	1.9***	1.4	0.2	4.2	PBS	2013
Women's Empowerment in Agriculture Index	2057	0.797				PBS	2013
5DE Sub-index	2057	0.785				PBS	2013
GPI Sub-index	1160	0.909				PBS	2013
Prevalence of households with moderate or severe hunger	2365	13.51	1.16	2.30	2.72	PBS	2013
M&F (both male and female adults)	1878	13.18**	1.21	2.39	2.38	PBS	2013
MNF (male adult(s) only)	126	6.41**	2.50	4.95	1.24	PBS	2013
FNM (female adult(s) only)	361	17.42**	2.38	4.72	1.47	PBS	2013
Prevalence of children 6-23 months receiving a minimum acceptable diet	431 <sup>2</sup>	26.05	2.72	5.39	1.65	PBS	2013
Male	200	23.55	3.85	7.63	1.67	PBS	2013
Female	231	28.29	3.01	5.97	1.01	PBS	2013
Women's dietary diversity: Mean number of food groups consumed by women of reproductive age	2097	4.08	1.14	0.11	4.3	PBS	2013
Prevalence of exclusive breastfeeding of children under six months of age	167	48.50	3.76	7.45	0.94	PBS	2013
Male	94	46.75	6.67	13.23	1.65	PBS	2013
Female	73	50.66	7.36	14.59	1.62	PBS	2013

Statistically significantly different at the 10% (\*) 5% (\*\*) or 1% (\*\*\*) levels

<sup>2</sup> Eighty three children aged 6-23 months had missing information on frequency of feeding and were excluded in computation of this indicator

## **1.4. Purpose and Organization of this Report**

This report presents results of the FTF population-based baseline survey (PBS) conducted in the FTF ZOI in Kenya. The baseline information establishes the current status of the indicators of interest in the ZOI and will be the benchmark for performance monitoring and impact evaluation of the FTF interventions. Section 2 of the report outlines the methodology used in the PBS. Survey results on key indicators of interest to FTF (summarized in Table 2 above) are described in section 3. Section 4 is on country specific analysis, and presents relationships between selected indicators. Highlights of key findings conclude the report in section 5.

## **2. Methodology for Obtaining Baseline Values for the PBS Indicators**

### **2.1. Primary Data Collection**

The FTF PBS collected consumption and expenditure data on a sample of households; food consumption data on a select group of children (aged 0-23 months) and women of reproductive age (15-49 years) residing in the households; and decision making and access to productive assets by primary male and female decision makers residing in the households.

While anthropometry information and prevalence of anaemia among children 0-59 months and women of reproductive age would form part of the baseline information for FTF, data on these indicators were not collected in this survey on technical grounds, and following discussions with USAID Kenya, Agriculture, Business and Environment Office (ABEO). Baseline information on these indicators will be obtained from the Kenya National Micronutrient Survey (KNMS) conducted in 2011 by the Ministry of Public Health and Sanitation.

#### **2.1.1. Review of Standard Questionnaire Modules**

The PBS instrument for the FTF ZOI provided in Volume 8 of the FTF M&E Guidance Series was used for the survey. This instrument was adapted to the local context and the layout customized to Tegemeo's data entry tools by a team of researchers at Tegemeo Institute. Adapting the instrument to the local context was an iterative and interactive process. The USAID Kenya ABEO was consulted on every amendment to the questionnaire until the final version of the instrument was approved by the USAID Kenya ABEO.

The questionnaire was adapted to collect information on: household demographics, dwelling characteristics, consumption expenditure and hunger scale; primary male and female's role in household's decision making in production and income generation, access to productive assets, individual leadership and influence in the community, membership and influence in groups and time allocation; women's dietary diversity; and infant and young child feeding.

The approved version of the questionnaire was used in training enumerators and pre-tested together with the enumerators, and eventually used to collect data.



### **2.1.2. Timing of Survey Work**

#### ***Enumerator training***

A team of fifty-five enumerators (29 men and 26 women) were trained and engaged in data collection. The enumerators were bachelor's degree holders with training in Agriculture-related disciplines, Sociology, Food & Nutrition and Health sciences, and with some experience in household data collection. The first team of forty-five enumerators was trained in November 2012 by a team of researchers from Tegemeo Institute and Michigan State University. The plan was to begin data collection in early December 2012. However, data collection did not begin as planned due to, among other reasons, technicalities in obtaining ethical clearance from relevant authorities. Because of this delay and the fact that Kenya's general elections were nearing, Tegemeo and USAID Kenya ABEO discussed and agreed that the enumeration team be expanded to shorten the duration of fieldwork. As a result, additional ten enumerators were trained in early January 2013. Recap training for all the fifty-five trained enumerators was conducted two days before data collection, which began on 13<sup>th</sup> January 2013.

The training involved the following activities:

- i. Going through the questionnaire in a classroom setting, explaining to and discussing with the enumerators the meaning of each question in the questionnaire and the information sought by the question
- ii. In a classroom setting, enumerators practicing how to ask the questions, how to probe for responses and how to record the responses
- iii. Enumerators pre-testing the questionnaire on households in an area that was not selected for the actual survey. This was aimed at ensuring that each enumerator understood the questionnaire and was able to administer it, and identifying areas in the questionnaire that would require revision.

Experience from the training sessions and pre-test exercise informed further revisions to the questionnaire.

As reference materials during fieldwork, enumeration and supervision manuals were prepared and provided to the enumerators and supervisors, respectively. The manuals served as guides to enumerators in administering the questionnaires and solving problems in the field, and to supervisors in managing the enumeration team and the fieldwork in general.

#### ***Data Collection***

Data collection began on 13<sup>th</sup> January 2013 and lasted thirty four (34) days. This timing ensured that the survey did not coincide with the Christmas holidays, a period during which consumption expenditure would be expected to be high and not typical. The timing also ensured that data collection was concluded some weeks before General Elections, an event which would enhance insecurity risks.

Before data collection began, interview dates for each of the sampled cluster were communicated to the Kenya National Bureau of Statistics (KNBS) District Statistical Officers (DSOs), who were to direct the data collection teams to the sampled clusters and sampled households within the clusters. The DSOs liaised with the village elders in the sampled clusters in advance to inform the households about the survey. This was to ensure that cases of missing respondents were minimized.

The 55 enumerators were grouped into 11 data collection teams, each comprising of five enumerators, one supervisor and one driver. Each team was allocated the clusters in which to collect data. Supervision of data collection was done by Research Assistants at Tegemeo Institute with many years of experience in the work. They were responsible for team management and day to day team activities in the field. They were also responsible for conducting spot checks on enumerators during interviews and checking and ensuring correction of mistakes by enumerators on the questionnaires.

In addition to the data collection teams, three Tegemeo researchers, led by the survey coordinator, went round visiting the teams during the first two weeks of data collection to provide technical backstopping and assess quality of data collection. It is during the first week of field work that many technical and logistical issues were experienced, and the three researchers were specifically out to attend to those issues.

The questionnaire was administered to the primary and secondary respondents, who self-identified as the primary male and female (or female only), members responsible for decision making within a household. In female adult only and male adult only households, however, there was only a primary respondent – the principal female/male decision-maker aged 18 or older. In addition to the primary and secondary respondents, women of reproductive age and caretakers of children 0-23 months of age in each household were individually interviewed regarding food items consumed by the women and children within the last 24 hours.

Module G of the questionnaire required that the sex of the enumerator matched the sex of the respondent. Therefore, in assigning an enumerator to a household to conduct an interview, it was ensured as much as possible that if the household was male and female adult or female adult only, Module G was administered by an enumerator that is of the same sex as the respondent.

### **2.1.3. Survey Sample Design**

The design of the survey was informed by several factors. The geographical area of focus was the FTF ZOI (HR1 and SA2). The ZOI covers 22 counties. Given the agricultural focus of the Kenya FTFS, the scope of the survey was confined to the rural population in the ZOI.

Another factor considered was the indicators to be collected. The need to collect both household level information and information on select groups of individuals in a household meant that several members of a household needed to be interviewed. As such, there were to be more than one respondent in each household: the primary and secondary respondents, who

self-identified as the primary male and female members responsible for social and economic decision making within a household. In male and female adult households, they would usually be the husband and wife, but they could also be other household members as long as they were aged 18 and over. In female adult only and male adult only households, however, there was to be only a primary respondent – the principal female/male decision-maker aged 18 or older. In addition to the primary and secondary respondents, women of reproductive age and caretakers of children in each household were to be individually interviewed to get information on the food items consumed within the last 24 hours. In this way, the collected data would provide information about level of empowerment of women in agriculture, women's dietary diversity and infant young child feeding in the rural farm households in the ZOI.

The survey design also took into account the need to have a sample size that would adequately provide information on various population groups since various indicators would be measured at different levels; household and individual (mainly women and children). This aspect was considered in designing the survey sample, as explained below.

#### *Sample size calculation*

The sample size was determined by the requirements to capture changes in the following three key impact indicators of prevalence of poverty, and underweight and stunting in children less than five years of age, as recommended in the FTF Monitoring and Evaluation (M&E) Guidance Series. Although this survey did not collect information on stunting and underweight in children less than five years of age, the guidelines in calculation of the sample size taking into account these indicators was nevertheless followed.

For each of the three indicators, a sample size was calculated using estimated baseline prevalence (from external sources) provided by the Kenya USAID ABEO and targeted change over five years, and the largest of the sample sizes used as the overall minimum required sample size. The basic equation to calculate the sample size required to capture the desired change in each of the three indicators is:

$$n = D * [(Z_{\alpha} + Z_{\beta})^2 * (P_1 (1 - P_1) + P_2 (1 - P_2)) / (P_2 - P_1)^2], \text{ where}$$

$n$  = required minimum sample size per survey round;

$D$  = design effect (assumed to be 2 in this case);

$P_1$  = the estimated baseline value of the indicator (expressed as a proportion, not a percentage);

$P_2$  = the expected value of the indicator after 5 years – the FTF program period (expressed as a proportion) ---  $(P_2 - P_1)$  is the targeted change in the indicator after 5 years;

$Z_{\alpha}$  = the Z-score corresponding to the desired level of statistical significance  $\alpha$  (0.05 in this case); and

$Z_{\beta}$  = the Z-score corresponding to the desired level of statistical power  $1 - \beta$  (0.2 in this case).

After calculating the sample size as explained above, the sample was inflated to arrive at the eventual number of households to interview because: a) households might decline to be interviewed (i.e., non-responding households); and b) households might not have children under the age of five. As such, there was need to determine how many additional households must be visited to capture the required number of children for the underweight and stunting indicators, even if the sample required for the poverty indicator would be driving the sample size. We used the method proposed under the Food and Nutrition Technical Assistance II (FANTA-2) project (see Diana and Megan, 1997) to adjust (by inflating and deflating) the underweight and stunting sample sizes.

To compensate for non-responding households, the rule of thumb used was to increase the resulting sample sizes for the three indicators by 10 percent. On the basis of the guidelines above, the computed sample sizes for each indicator are presented in Table 3 below.

**Table 3: Computed sample size**

	Indicator		
	Poverty	Underweight	Stunted
Initial sample size (using the basic equation above)	2,365 (Households)	1,261 (Children under 5 years)	1,056 (Children under 5 years)
	<b>No. of households</b>		
Initial sample size (households)	2,365	1,864	1,560
Inflating sample size to account for households with no children under 5 years	2,365	2,565	2,147
Deflating the inflated sample size to account for more than 1 child under five years in a household	2,365	2,377	1,990
Adjusting the deflated sample size to account for household non-response	2,601	2,615	2,189
<b>Final sample size</b>		<b>2,615</b>	

#### *Stratification design*

The FTF population-based household baseline survey utilized a combination of stratified and multi-stage sampling methodology. The survey targeted the population in rural administrative Locations in 22 Counties in the ZOI (HR1 and SA2). HR1 and SA2 were considered as strata, and each of the 22 Counties belonged to either HR1 or SA2.

### *Sampling methodology*

For sample frame purposes, the survey used the fifth National Sample Survey and Evaluation Programme (NASSEP V) household sample frame developed and maintained by the Kenya National Bureau of Statistics (KNBS). The frame was developed in 2012 using Probability Proportional to Size (PPS) sampling methodology and is based on households from the 2009 Kenya Population and Housing Census. The NASSEP V frame is designed to be composed of 5,360 clusters using Rural/Urban areas within each of Kenya's 47 Counties as the level of stratification. The frame is designed in multi-tiered structure with four equal sub-samples (C1, C2, C3 and C4) of 1,340 clusters that can each serve as a frame on its own. At the time of the survey, C1 and C2 sub-samples (totaling approximately 2,500 clusters) had been developed in 44 Counties.

In order to determine the number of clusters to sample for the PBS, the sample size of 2,615 households explained above was divided by the number of households to sample from each cluster, which in our case were 25. This resulted in 104.6 clusters precisely, which were rounded off to 105. The sample size used was thus 2,625 households. The sample was allocated proportionately to the two strata (i.e. HR1 and SA2) based on the number of households in the rural Locations in each of the stratum.

After sample allocation to the two strata, NASSEP V clusters that fell within target administrative Locations were identified and the required number of clusters selected using Equal Probability Selection Method (EPSEM). From each cluster, a sample of 25 households was selected using systematic (with random start) sampling methodology. The sample allocation is presented in Table 4.

**Table 4: Sample allocation for the PBS**

Area	No. of households in selected Locations*	Sample Size	
		No. of Clusters	No. of Households
HR1	2,105,521	75	1,875
SA2	847,055	30	750
<b>TOTAL</b>	<b>2,952,576</b>	<b>105</b>	<b>2,625</b>

\*Selected targeted rural locations as per 2009 census

### *Sampling weights*

Overall, 2,365 households (90% of the number sampled) were interviewed, comprising 1,878 male & female adult, 361 female adult only, and 126 male adult only households (Table 5).

Because 10 percent of the sampled households were not interviewed for various reasons, the resulting data may generate biased estimates. A solution in this case is for the data to be weighted to account for unequal selection probabilities and non-responses. The data needed two sets of weights i.e. *normalized household weights* and *normalized population weights*. The household weights were applicable on household related variables while population ones were used on individual's variables.

The weighting took the following mathematical relation:

$$W_{hi} = D_{hi} \times \frac{S_{hi}}{I_{hi}} \times \frac{C_h}{c_h}$$

where,

- $W_{hi}$  = Overall cluster gross weight for the i-th cluster in the h-th stratum (in this case HR1 or SA2)
- $D_{hi}$  = Sample cluster design weight obtained from cluster selection probabilities for the i-th cluster in the h-th stratum
- $S_{hi}$  = Number of listed households in the i-th cluster in the h-th stratum
- $I_{hi}$  = Number of responding households in i-th cluster in the h-th stratum
- $C_h$  = Number of operating clusters in h-th stratum
- $c_h$  = Number of selected clusters in the h-th stratum

Gross weights were first developed for households (per cluster) and then the same weights applied to individuals within the cluster before they were normalized.

The gross weights were normalized for the whole sample so that the total number of weighted cases was equal to the number of un-weighted cases. Normalization of weights was done independently for households and individuals. Normalized weights have a mean of 1.0 and are used to avoid generating incorrect standard errors and confidence intervals and are valid for estimation of proportions and means.

The weights computed were applied in calculating the means and proportions, as the case may be, for the indicator values.

**Table 5: Number of interviewed households**

Area	No. of hh interviewed			Total
	-----Type of household-----			
	Male & female adult	Female adult only	Male adult only	
HR1	1336	284	80	1700
SA2	542	77	46	665
Total	1,878	361	126	2,365

#### 2.1.4. Challenges and Limitations

Some challenges were faced in the planning and implementation of the survey. Although data collection was conducted weeks before General Elections, it coincided with enhanced political activities, which posed insecurity risk to the field teams, and resulted in rescheduling interviews in some areas. However, none of the field teams experienced any harmful incident arising from insecurity. Another challenge was getting both primary and secondary respondents for interviews in male & female adult households, and other persons to respond to sections in the questionnaire. This made multiple callbacks more frequent, and in some

cases without success. In male & female adult households, most of these cases involved men working away from home. The callbacks made fieldwork more intensive, with the teams working beyond stipulated time each day, including weekends, and at times very late in the evenings. We recognize that some of the challenges arose from the uniqueness of the design, and therefore, execution of the PBS. Despite the challenges, the survey work was successfully accomplished.

The PBS results are for the FTF ZOI, the region at which the sample is deemed representative. Also, the sample was confined to rural areas within the ZOI. As such, the survey findings cannot be generalized to the whole country.

### **3. Descriptive Findings**

This section describes the findings of the survey. Highlights on selected household demographic and dwelling characteristics as well as household access to water and sanitation facilities are presented. Results on the seven key indicators of interest to the FTF are discussed.

#### **3.1. Household Characteristics**

##### **3.1.1. Household Demographics**

Some characteristics of the primary respondents reported for all households and by household type (male & female adult; female adult only; and, male adult only)<sup>3</sup> are presented in Table 6. The primary respondents were primary male or female members responsible for social and economic decision making within a household. Most of the primary respondents in male and female adult households were female (72%) and their average age was 44 years. The average age of the respondents was significantly different across the household types, with respondents from female adult only households about 13 years older than respondents in other household types. The respondents in the female adult only households are likely to be mainly widows advanced in age.

Overall, about 50 percent of primary respondents had primary 4-8 level of education, and this was also the case in male and female adult and male adult only households. However, for female adult only households, 33 percent of the respondents had primary 4-8 level of education while a higher percentage (41%) had less than primary education. Relatively few respondents across all household types had education above secondary 1-4.

Other household demographic characteristics are presented in Table 7. Overall, the mean number of total and female household members was 5.5 and 2.7, respectively. The mean number of older children (5-17 years) was higher than for younger children (0-5 years). On average, all the older children were reported to be attending school. Across household types, male and female adult households had significantly higher means for all the demographic indicators, compared to the other household types, with the male adult only households registering the lowest means. Male adult only households did not have children 0-5 years and appeared to be one-member households.

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<sup>3</sup> Child only households were not encountered in the PBS



**Table 6: Sex, age and education level of primary respondents**

Characteristic	Type of household							
	Male and female adult		Female adult only		Male adult only		All households	
	Mean/ %	Std Dev/ Error	Mean/ %	Std Dev/ Error	Mean/ %	Std Dev/ Error	Mean/ %	Std Dev/ Error
<b>Sex (%)</b>								
Male	27.8	1.4			100		27.1	1.3
Female	72.2	1.4	100				73.0	1.3
<b>Age (mean years)</b>	42.5***	15.4	55.0***	18.0	42.0***	19.1	44.4	16.7
<b>Education (%)</b>								
Less than Primary	12.5	1.0	41.3	3.6	10.2	2.8	16.9	1.2
Primary 1-3	9.9	0.8	11.9	2.1	11.1	2.8	10.3	0.7
Primary 4-8	52.8	1.4	33.2	2.8	48.7	4.7	49.5	1.2
Secondary 1-4	18.3	1.3	7.9	1.6	18.1	3.7	16.7	1.2
Tertiary after O-Level	3.6	0.7	2.1	0.9	4.2	1.9	3.4	0.6
Secondary 5-6	0.1	0.1	0.0		0.7	0.7	0.1	0.1
University of above	1.2	0.3	0.3	0.3	3.3	1.6	1.1	0.2
Technical or vocational	0.9	0.2	1.1	0.6	3.4	1.8	1.0	0.2
No formal education	0.7	0.2	2.2	0.8	0.0		0.9	0.2

Differences across household types statistically significant at the 10% (\*) 5%(\*\*) or 1%(\*\*\*) levels

Note: Std errors are for proportion/percentages while Std Dev is for means

**Table 7: Household demographic indicators**

	# HH members		Number of female HH members		Number of children 0- 5 years		Number of children 6-23 months		Number of children 5-17 years		Children currently attending school (5-17 years)		N (unweighted)
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
All households	5.5	2.6	2.7	1.6	0.9	1.0	0.2	0.4	2.1	1.7	2.0	1.6	2365
Male & female adult	6.0***	2.4	3***	1.6	1.0***	1.0	0.3***	0.5	2.2***	1.7	2.1***	1.6	1878
Female adult only	3.8***	2.2	2.5***	1.5	0.5***	0.8	0.1***	0.3	1.9***	1.7	1.8***	1.6	361
Male adult only	1.8***	1.4	0.2***	0.6	0.0***	0.2	0***		0.5***	1.1	0.4***	1.0	126

Differences across household types statistically significant at the 10% (\*) 5%(\*\*) or 1%(\*\*\*) levels

### 3.1.2. Dwelling Characteristics and Water and Sanitation

On average, surveyed households owned their main houses and had an average of about three (3) rooms, but the number of rooms differed significantly among household types (Table 8). Male and female adult households had slightly more rooms compared to the other household types. Majority (87.6%) of the households had houses roofed with corrugated iron sheets, followed by a smaller percentage with thatched roofs and less than one percent with houses roofed with plastic materials (Table 9). Over 60% of the houses had earth/mud walls, with the others having concrete, tile/brick, wood or iron sheet walls (Table 10). Results presented in Table 11 show that house floors were mainly earth/mud (about 70%) but a considerable proportion (28%) of houses had concrete floors.

Overall, the proportion of households with electricity, improved water source and sanitation facilities were 13.9, 54.5 and 14.5 percent, respectively, and varied significantly among household types, except for proportion with improved water source (Table 8). Percentage of households with electricity and improved sanitation was highest among male adult only households, and lowest among female adult only households.

The most commonly used cooking fuel was firewood, reported by nearly 92 percent of the households as the main source of cooking fuel (Table 12). A lower percentage of male adult only households used firewood relative to other household types but a higher percentage of them used charcoal, gas and kerosene compared to other household types.

**Table 8: Household dwelling characteristics**

	Number of rooms		HH with electricity		HH using improved <sup>4</sup> water source		HH using improved <sup>5</sup> sanitation facilities		N (unweighted)
	Mean	Std Dev	%	Std Error	%	Std Error	%	Std Error	
All households	2.5	1.2	13.9	1.5	54.5	3.2	14.5	1.4	2365
Male & female adult	2.6***	1.2	15.1***	1.6	55.0	3.4	15.3**	1.6	1878
Female adult only	2.3***	1.0	6.9***	1.7	53.8	3.9	10.2**	1.9	361
Male adult only	1.9***	1.1	17.3***	4.2	47.8	6.2	16.9**	4.0	126

Differences across household types statistically significant at the 10% (\*) 5%(\*\*) or 1%(\*\*\*) levels

**Table 9: Roof type**

	Tile	Corrugated	Plastic	Thatched	N (unweighted)
	-----% of HH-----				
All households	0.4	87.6	0.4	11.6	2365
Male & female adult	0.3	87.6	0.3	11.7	1878
Female adult only	0.5	89.1	0.4	10.1	361
Male adult only	2.1	83.2	1.1	13.6	126

<sup>4</sup> Improved water sources are; Piped into dwelling/plot/yard, public/private tap, tube well/borehole, protected dug well, protected spring, rain water collected or bottled water

<sup>5</sup> Improved sanitation facilities are; flush toilet and ventilated improved pit latrine

**Table 10: Wall type**

	Earth /mud	Concrete	Tile /brick	Wood	Iron sheets	
	-----% of HH-----					N (unweighted)
All households	60.5	15.7	13.4	10.0	0.5	2365
Male & female adult	60.4	14.8	14.1	10.3	0.5	1878
Female adult only	65.4	17.4	10.1	6.8	0.4	361
Male adult only	47.1	24.1	12.9	15.1	0.9	126

**Table 11: Floor type**

	Earth /mud	Concrete	Tile/Bricks	Wood	
	-----% of HH-----				N unweighted
All households	69.8	28.0	1.5	0.7	2365
Male & female adult	69.9	27.6	1.8	0.7	1878
Female adult only	72.0	27.2	0.4	0.4	361
Male adult only	61.0	36.5	1.2	1.4	126

**Table 12: Fuel type**

	Electricity	Piped /liquid propane gas	Kerosene	Charcoal	Firewood	Agricultural crop residue	Biogas
	-----% of HH-----						
All households	0.1	0.8	0.5	6.8	91.7	0.1	0.0
Male & female adult	0.1	0.5	0.2	6.1	93.0	0.1	0.1
Female adult only	0.0	0.6	1.0	7.0	91.3	0.1	0.0
Male adult only	0.0	4.9	5.1	18.4	71.5	0.0	0.0

### 3.2. Household Consumption Expenditure

Household consumption expenditure data was used as a summary measure of poverty. The components of consumption were aggregated into four broad categories namely, food items, non-food items, consumer durables, and housing, and consumption expenditure on these items computed following Deaton and Zaidi (2002).

Food consumption expenditure was computed as the total value of all food items consumed in the reference period. This included food consumed by households from various sources: (i) food purchased from the market, (ii) food that was home-produced, and (iii) food items received as gifts or remittances from other sources such as relief programmes and relatives/friends and neighbours. The food items included those eaten communally in the household and separately by individual household members, both inside and outside the home. For purchased food items, the cost of buying them was taken to represent the household expenditure on those items. For food items that were home produced or received as gifts, a price was imputed using the median cluster price for the specific food item. In cases where a particular food item was consumed by some households but not purchased by any of the households in a particular cluster, a median price was calculated for the next higher administrative or aggregation level (i.e. division, county and national) for which price

information was available. The value for each of these food items was computed by multiplying the imputed price per kg by the quantity (kg) consumed. Since expenditure on food was collected for a 7-day reference period, this was converted to a 1-year period and the total expenditure on food in annual terms obtained by summing up the annual values across all food items.

The non-food category consisted of a wide range of items and expenditures including daily use items such as soap and kerosene; miscellaneous personal care items; less frequently purchased items such as clothing and kitchen equipment; and, health and education expenditures for all household members. Data on purchases of non-food items was collected for different recall periods: one week, one month, three months and one year. The reported costs of the items were converted to a uniform reference period of one year and then summed across all the items. Following the provided guidelines (Deaton and Zaidi, 2002) some expenditures were excluded from the computation of the consumption aggregate for non-food items. These were council rates; fines or legal fees; lumpy and infrequent expenditures such as bride price and costs for marriage ceremony, graduation, funeral and rites of passage; and, loan repayments and mortgages. To avoid double counting of donations and gifts, they were excluded for donating households but included for the receiving households.

For the household consumer durables, the relevant component that was included in the consumption aggregate was a measure of the value of the flow of services that durables yielded over a relevant time period rather than the expenditure on such items. Therefore, we calculated the user cost or rental equivalent of the durable goods. The information used to determine the user cost was the current value and age of the durable good owned by a household. An estimate of the flow of services from the goods was derived by dividing the current replacement value of the good by its expected remaining life. The interest component in the flow of services was not taken into account.

The calculation of housing expenditure followed the same principle as that for the durable goods. What was included in the consumption aggregate was a measure of the value of flow of services that the household received from occupying its dwelling. This value was given by rent paid (for households that rented their dwellings) and imputed rents (for non-renting households: those that owned their dwellings or who received them from employers or other sources and were not paying rent). In cases where actual or imputed rental values were not provided, the current sale value of the dwelling was used. The cluster median of the ratio of rental to property value was used to calculate an imputed rental value. In cases where the property value was missing, a median value per room was used in each cluster to assign a property value to the dwelling based on the total number of rooms. The estimated property value was then used to estimate its rental value. The annual actual and imputed rental values were then computed.

Total household consumption expenditure was computed by summing all the consumption estimates from the food, non-food, housing, and durable goods categories. To adjust for cost of living differences among households, the total nominal consumption expenditure was deflated by the Paasche price index, in which the weights vary from household to household.

The index was computed following the guidelines provided by Deaton and Zaidi (2002: pp 40-43). The consumption expenditures were also adjusted using the arbitrary approach (Deaton and Zaidi, 2002: pp 51-52) to take into account differences in household composition. The annual total household consumption expenditure was divided by household size to obtain per-capita annual expenditure, which was reduced to per-capita expenditure per day by dividing by 365.

### **3.2.1. Prevalence and Depth of Poverty**

Prevalence and depth of poverty were computed using per capita expenditure per day as explained above, and a poverty line of USD 1.25 which was converted to local currency using 2005 PPP exchange rate (KES 32.68) and adjusted to 2012 equivalent using consumer price index (CPI) obtained from International Monetary Fund's *International Financial Statistics* data report. The following two specific steps were followed to arrive at the poverty line:

#### Step 1

The USD 1.25/day was converted into KES at the 2005 PPP exchange rate, to get the equivalent value in KES at 2005 prices:

- $\text{USD } 1.25 \times 32.68 \text{ KES /USD} = \text{KES } 40.85 \text{ (2005 prices)}$

#### Step 2

The KES 40.85 was adjusted for the cumulative change in the Consumer Price Index (CPI) between 2005 and 2012:

- $\text{KES } 40.85 \text{ (2005 prices)} \times (\text{CPI}_{2012}/\text{CPI}_{2005}) = 40.85 \times (224.60/100) = \text{KES } 91.75 \text{ (2012 prices)}$

The poverty line in KES was thus 91.75. An individual was defined as poor if his/her expenditure (the per capita expenditure of the household in which he/she belongs) was lower than KES 91.75.

Poverty was analyzed using two measures: the *headcount*, which measures the proportion of the population that is poor; and *poverty depth (or poverty gap index)*, which measures the extent to which individuals fall below the poverty line as a proportion of the poverty line (World Bank, 2005). Overall, 44.7 percent of individuals in the survey were poor (Table 13). This proportion differed significantly across household types, and was comparatively lower in male adult only households, who represented less than 2 percent of total household members in the survey. The depth of poverty, measured by the poverty gap index, was on average 0.14, and was significantly different among household types. Both poverty prevalence and poverty depth between male & female adult and female adult only households were not statistically different.

**Table 13: Prevalence and depth of poverty (USD 1.25/day poverty line)**

Household type	Prevalence of poverty		
	N (unweighted)	Percentage	Std. Error
Male & Female adult	11284	45.4***	2.2
Female adult	1389	45.3***	2.9
Male adult	227	4.9***	2.5
Total	12900	44.7	2.1
Household type	Poverty gap index		
	N (unweighted)	Mean	Std. Dev.
Male & Female adult	11284	0.142***	0.206
Female adult	1389	0.140***	0.204
Male adult	227	0.017***	0.088
Total	12900	0.140	0.205

Differences across household types statistically significant at the 10% (\*) 5%(\*\*) or 1%(\*\*\*) levels

Note: The difference in poverty prevalence and gap index between male & female adult and female adult only households was statistically insignificant.

### 3.2.2. Per Capita Expenditure

#### *Expenditure levels*

Overall, the mean per capita per day expenditure of USG targeted beneficiaries was USD 2, and it differed significantly among the three household types (Table 14). Male only households had mean expenditure which was more than twice that of the other household types. Per capita expenditure across expenditure quartiles and deciles show existence of wide disparity, with the top quartile households spending on average five times more than those in the lowest quartile, while those in the top decile had expenditure levels approximately ten times greater than those in the bottom decile. Per capita expenditure in the lowest quartile and bottom decile didn't differ among the household types. However, there were significant differences in expenditures for second to fourth quartiles and the top decile among the household types. Huge disparities in expenditure between quartiles and deciles also existed within a household type. The largest disparity was reported among adult male only households, with those in the highest quartile spending nearly eight times more than those in the lowest quartile, and those in the top decile having expenditure levels that were about eleven times larger than those in the bottom decile.

**Table 14: Per capita per day expenditure of USG targeted beneficiaries (USD)**

	Mean	Quartile				Deciles		N (unweighted)
		1	2	3	4	Top	Bottom	
All households	2.0	0.79	1.3	1.9	4.0	5.8	0.6	12900
Male & female adult	2.0***	0.79	1.3***	2.0***	4.0***	5.6***	0.6	11284
Female adult only	1.9***	0.79	1.4***	1.9***	3.9***	5.5***	0.6	1389
Male adult only	4.6***	0.81	1.5***	1.9***	6.1***	7.9***	0.7	227

Differences across household types statistically significant at the 10% (\*) 5%(\*\*) or 1%(\*\*\*) levels

### *Expenditure shares*

Shares of the different items in household per capita expenditure are presented in Table 15. Food and non-food items had the largest shares at 0.56 and 0.33, respectively. Food had the largest share in expenditure irrespective of household type. Expenditure shares for the different items differed significantly among household types, except for housing expenditure. Share of food in expenditure was highest and share of durable goods lowest for Female adult only households compared to the other household types. The share of non-food items in expenditure was highest among male and female adult households.

**Table 15: Per capita expenditure shares**

	Food		Non-food		Durable goods		Housing	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
All households	0.56	0.17	0.33	0.15	0.04	0.07	0.07	0.07
Male & female adult	0.55***	0.17	0.33***	0.15	0.04***	0.07	0.07	0.07
Female adult only	0.61***	0.15	0.30***	0.14	0.02***	0.03	0.07	0.06
Male adult only	0.59***	0.19	0.30***	0.17	0.04***	0.07	0.07	0.07

Differences across household types statistically significant at the 10% (\*) 5%(\*\*) or 1%(\*\*\*) levels

### **3.3. Nutrition and Household Hunger**

#### **3.3.1. Child Nutrition**

#### *Exclusive breastfeeding*

We followed the guidelines provided in the *Indicators for Assessing Infant and Young Child Feeding Practices Part 2: Measurement* by World Health Organization (2010) to calculate indicators of exclusive breastfeeding and minimum acceptable diet for infants and young children. Exclusive breastfeeding was calculated only for infants 0-5 months of age. An infant was defined to be exclusively breastfed if breastfed or fed (expressed) breast milk with a spoon, cup or bottle in the day or night preceding the survey, but received no other fluids (other than water).

Infants and young children less than six months of age represent about one quarter of all children less than two years in the households surveyed (167 of a total of 681). Of these, 48.5% were exclusively breastfed (Table 16). Prevalence of exclusive breastfeeding among children under six months in Kenya was reported to be 31.9 percent, according to the 2008-2009 Demographic and Health Survey (DHS), the most recent nationwide DHS. Virtually all the children (160 of 167) were in male and female adult households, in which the percentage of exclusively breastfed children was 48.7%. Among the few (7 in number) in female adult only households, prevalence of exclusive breastfeeding was 42.2 percent, but this may not be a meaningful statistic given the small subsample size. No children under six months of age were encountered in male adult only households.

**Table 16: Prevalence of exclusive breastfeeding of children under six months of age**

	Baseline Value	Std error	N (unweighted)
All households	48.5	3.8	167
Type of Household			
Male and Female Adult	48.7	3.9	160
Female Adult Only	42.1	19.9	7

Differences across household types statistically significant at the 10% (\*) 5%(\*\*) or 1%(\*\*\*) levels

#### ***Minimum acceptable diet***

In contrast to the exclusive breastfeeding indicator, the minimum acceptable diet indicator pertains to children between 6 and 23 months of age, inclusive. The minimum acceptable diet indicator has a more complex construction, involving computation of two major components. Each component summarizes several feeding practices which differ depending on whether a child is breastfed or non-breastfed.

Considering first the children who are breast-fed, we computed the percentage who had at least the minimum dietary diversity and the minimum meal frequency based on consumption during the previous day. Minimum dietary diversity is defined as the percentage of this age group who received foods from 4 or more food groups out of a total of 7 (see WHO (2010) for the list of groups) during the day or night preceding the survey. Among breast-fed children, the minimum meal frequency is defined as the percentage of the same age group who received solid, semi-solid, or soft foods 2 times if 6-8 months and 3 times if 9-23 months.

Among non-breastfed children, minimum acceptable diet also considers 2 milk feedings, and minimum meal frequency for solid, semi-solid, or soft foods was 4 times for all children 6-23 months of age. In other words, if a child was not breast-fed, 2 milk feedings and more foods were required to meet minimum standards.

Overall, 27.3 percent of children had minimum acceptable diet, in a subsample of 431 children aged 6-23 months (Table 17). The Kenya 2008-2009 DHS estimated prevalence of children aged 6-23 months receiving minimum acceptable diet to be 38.5 percent. Interestingly, the prevalence of minimum acceptable diet was more favourable among female adult only households (51.4%) as compared to male and female adult households (25.8%), with the difference in the prevalence between the two groups of households statistically significant<sup>6</sup>. While a higher percentage of children were breastfed among male and female adult households compared to female adult only households (48.7% vs. 42.1%, respectively), it appears that the share of children in female adult only households receiving minimum number of meals was higher whether or not they were breast-fed.

<sup>6</sup> It is noteworthy that male adult only households did not have children within this age range.



**Table 17: Prevalence of children 6-23 months receiving a minimum acceptable diet**

	Baseline Value	Std error	N (unweighted)
All households	27.3	2.8	431
Type of Household			
Male and Female Adult	25.8***	2.8	403
Female Adult Only	51.4***	9.1	28

Differences across household types statistically significant at the 10% (\*) 5%(\*\*) or 1%(\*\*\*) levels

### *Frequency of feeding*

The proportion of children 6-23 months with minimum feeding frequency (as explained above) was significantly higher in female adult only households compared to male and female adult households (Table 18).

**Table 18: Prevalence of children 6-23 months with minimum feeding frequency**

	Baseline Value	Std error	n (unweighted)
All households	73.9	3.0	431
Type of Household			
Male and Female Adult	72.8**	3.1	403
Female Adult Only	92.0**	4.4	28

Differences across household types statistically significant at the 10% (\*) 5%(\*\*) or 1%(\*\*\*) levels

### *Dietary diversity*

Percentage of children 6-23 months that received minimum dietary diversity averaged 30 percent overall, and was significantly higher in female adult only households than in male and female adult households (Table 19).

**Table 19: Prevalence of children 6-23 months receiving minimum dietary diversity**

	Baseline Value	Std error	n (unweighted)
All households	30.2	2.4	514
Type of Household			
Male and Female Adult	29.2**	2.4	481
Female Adult Only	45.8**	8.2	33

Differences across household types statistically significant at the 10% (\*) 5%(\*\*) or 1%(\*\*\*) levels

### **3.3.2. Women's Nutrition**

Nutrition for women of reproductive age (15-49 years) was analyzed in terms of their dietary diversity scores. To calculate dietary diversity scores, all foods consumed by a woman in the preceding 24 hours were categorized into 9 groups: grains and tubers; legumes and nuts; dairy products; organ meats; eggs; flesh meat, fish, and small animal protein; Vitamin A-rich dark green leafy vegetables; other vitamin A-rich vegetables and fruits; and other fruits and vegetables, and the number of food groups consumed summed for the woman.

On a scale that represents 9 food groups, women scored a mean of only 4.1, with no differences of mean among the household types (Table 20). Overall, the distribution of dietary diversity scores appears bell-shaped, or normally distributed. The mean is less than the midpoint of the highest possible score. It may be expected, though, that dietary diversity varies by season of the year, and the results shown here may be different if the survey was conducted at a different time of the year. The food groups included here have been generalized in order to allow comparison among FTF countries, and could be recoded to examine Kenyan diets more closely. Data on sugars, fats and oils were also recorded, but are not included in these groups.

**Table 20: Women’s Dietary Diversity: Mean number of food groups consumed by women of reproductive age**

	Baseline Value	Std dev	N (unweighted)
All households	4.1	1.1	2097
Type of Household			
Male and Female Adult	4.1	1.1	1851
Female Adult Only	4.0	1.1	243
Male adult only	4.2	1.1	3

Differences across household types statistically significant at the 10% (\*) 5%(\*\*) or 1%(\*\*\*) levels

### 3.3.3. Household Hunger

The household hunger scale was computed following the *Household Hunger Scale: Indicator Definition and Measurement Guide* by Ballard et al (2011). Three variables (how often a household went without food in the past 4 weeks preceding the survey; how often respondent or any household member slept hungry without food in the past 4 weeks; how often respondent or any household member went a whole day & night without eating anything) were coded into “rarely (1),” “sometimes (2),” and “often (3)” categories, with zero for no occurrence. These were then summed. A total score of 0-1 implies low hunger, 2-3 moderate hunger, and 4-6 severe hunger. It is noteworthy that although 13.5 percent of all households surveyed were classified as having experienced moderate or severe hunger, only 1.4 percent was in the severe category and 12.1 percent had experienced moderate hunger (Table 21). Differences were significant across household types. The prevalence of moderate or severe hunger was greatest among female adult only households (17.4%). Male adult only households had the highest prevalence of low to no hunger (93.6%) followed by male and female adult households (86.8%).

**Table 21: Prevalence of households with low, moderate and severe hunger**

	Low		Moderate		Severe		Moderate or Severe		n(unweighted)
	Baseline Value	Std error	Baseline Value	Std error	Baseline Value	Std error	Baseline Value	Std error	
All households	86.5	1.2	12.1	1.1	1.4	0.3	13.5	1.2	2,365
Type of Household									
Male and Female Adult	86.8**	1.2	11.7**	1.1	1.5	0.4	13.2**	1.2	1,878
Female Adult Only	82.6**	2.4	15.9**	2.3	1.5	0.6	17.4**	2.4	361
Male adult only	93.6**	2.5	5.4**	1.8	1.0	1.0	6.4**	2.5	126

Differences across household types statistically significant at the 10% (\*) 5% (\*\*) or 1% (\*\*\*) levels

### 3.4. Women's Empowerment

The Women's Empowerment in Agriculture Index (WEAI) is a survey-based index designed to measure empowerment, agency, and inclusion of women in the agricultural sector. It can also be used to assess gender parity in agriculture, identify key areas in which empowerment needs to be strengthened, and track progress over time (Alkire et al, 2012). The WEAI is an aggregate index comprising of two sub-indexes. The first assesses the degree to which women are empowered in five domains of empowerment (5DE) in agriculture. It reflects the percentage of women who are empowered and, among those who are not, the percentage of domains in which women enjoy adequate achievements. These domains are (1) decisions about agricultural production, (2) access to and decision-making power about productive resources, (3) control of use of income, (4) leadership in the community, and (5) time allocation. The second sub index (the Gender Parity Index [GPI]) measures gender parity. The GPI shows the percentage of women who are empowered or whose achievements are at least as high as the men in their households. For those households that have not achieved gender parity, the GPI shows the empowerment gap that needs to be closed for the women to reach the same level of empowerment as the men.

#### 3.4.1. WEAI and Components

The WEAI was computed from data collected from primary male and female in male and female adult households, and from primary female in female adult only households. The computation followed guidelines by Alkire et al, 2012. The WEAI for all households was 0.797 (Table 22). For male and female adult households, the WEAI was 0.790, which was a weighted average of the 5DE sub-index value of 0.785 and the GPI sub-index value of 0.909. For female adult only households, the 5DE sub-index was 0.824<sup>7</sup>.

<sup>7</sup>GPI for female adult only households could not be computed and so empowerment refers to the 5DE sub-index.

**Table 22: Women's Empowerment in Agriculture Index (WEAI)**

	Baseline Value	N (unweighted)
All households	0.797	2057
Type of Household		
Male and Female Adult	0.790	1724
Female Adult Only	0.824	333

The 5DE index was 0.785 and shows that 37.4 percent of women were empowered, which means that they had adequate achievements in four out of the five domains of empowerment, and thus enjoyed adequacy in some combination of the weighted indicators, summing up to 80 percent or more (Table 23). The women who were not empowered (62.6%) had a mean empowerment score of 0.656.

**Table 23: Women's 5 Domains of Empowerment (5DE) index**

	Baseline value
<b>5DE Index</b>	<b>0.785</b>
% of women achieving empowerment (score of 80% or greater)	37.42
Mean empowerment score for all female respondents	0.785
<b>N</b>	<b>2057</b>
Mean empowerment score for disempowered women	0.656
<b>N</b>	<b>1287</b>

Table 24 presents decomposition of the 5DE by domain and indicator, and shows the percentage of women that had adequate achievement (based on the relevant cut-off) with respect to each indicator. Results show that a relatively smaller proportion of women attained the threshold for autonomy in production, access to and decisions on credit, and workload.

**Table 24: Women's 5DE index by domain and indicator**

Domain	Indicator	% of women achieving indicator at baseline
<b>PRODUCTION</b>	Input in productive decisions	94.0
	Autonomy in production	40.2
<b>RESOURCES</b>	Ownership of assets	94.6
	Purchase, sale, or transfer of assets	84.2
	Access to and decisions on credit	50.3
<b>INCOME</b>	Control over use of income	94.3
<b>LEADERSHIP</b>	Group member	90.0
	Speaking in public	82.3
<b>TIME</b>	Workload	63.0
	Leisure	73.8

Gender parity in achieving the 5DE index is shown in Table 25 for primary adult male and female in a household. Males had significantly higher adequate achievements than females in all indicators except group membership, and the differences were relatively higher for indicators related to workload, autonomy in production and speaking in public.

**Table 25: Gender parity indicators**

		Baseline Value		
Domain	Indicator	% of males achieving indicator	% of females achieving indicator	Test of difference in %
<b>PRODUCTION</b>	Input in productive decisions	96.3	94.0	***
	Autonomy in production	55.0	40.2	***
<b>RESOURCES</b>	Ownership of assets	99.3	94.6	***
	Purchase, sale, or transfer of assets	95.7	84.2	***
	Access to and decisions on credit	59.3	50.3	***
<b>INCOME</b>	Control over use of income	96.7	94.3	***
<b>LEADERSHIP</b>	Group member	85.8	90.0	***
	Speaking in public	96.1	82.3	***
<b>TIME</b>	Workload	78.7	63.0	***
	Leisure	76.3	73.8	*

Statistically significant at the 10% (\*) 5% (\*\*) or 1%(\*\*\*) levels

## 4. Country-Specific Analysis of Findings

In this section we present specific analysis results pertaining mainly to relationships between the indicators. We also use national poverty line to estimate prevalence and depth of poverty, and compare these with national poverty estimates.

### 4.1. Poverty

In this sub-section, prevalence and depth of poverty were calculated using the national poverty line. The national poverty line was computed based on the KNBS rural poverty line of KES 1,562 per adult equivalent per month generated from the Kenya Integrated Household Budget Survey (KIHBS) conducted in 2005<sup>8</sup>. To get 2012 national rural poverty line, the 2005 rural poverty line was adjusted using the KNBS generated CPI. This resulted into a poverty line of KES 94.75. Based on this, prevalence of poverty was estimated to be 47 percent, while the poverty gap index was 0.15 (Table 26). Using 2005/2006 Kenya Integrated Household Budget Survey the KNBS estimated national absolute poverty prevalence to be 45.9 percent and rural absolute poverty to be 49.7 percent (KNBS, 2007). The rural poverty gap index was estimated to be 0.175. Therefore, the poverty figures generated by the PBS can be said to compare well with the national poverty estimates.

Both poverty measures were different across all household types, but were not statistically different between male & female adult and female adult only households.

**Table 26: Prevalence and depth of poverty using national poverty line**

Household type	N	Prevalence of poverty	
		Percentage	Std. Error
Male & Female adult	11284	47.7***	0.211
Female adult	1389	48.4***	0.210
Male adult	227	5.7***	0.092
Total	12900	47.1	0.210
Household type	N	Poverty gap index	
		Mean	Std. Dev.
Male & Female adult	11284	0.152***	0.211
Female adult	1389	0.151***	0.210
Male adult	227	0.018***	0.092
Total	12900	0.150	0.210

Differences across household types statistically significant at the 10% (\*) 5%(\*\*) or 1%(\*\*\*) levels

Note: The difference in poverty prevalence and gap index between male & female adult and female adult only households was statistically insignificant.

### 4.2. Women's Empowerment in Agriculture Index (WEAI)

#### 4.2.1. Primary Constraints to Women's Empowerment

The decomposition of the 5DE index by dimension and indicator provides a basis for identifying areas in which empowerment needs to be strengthened. Based on decomposition

<sup>8</sup> The KNBS poverty line of KES 1,562 was computed on per adult equivalent basis, while the expenditures in the FTF survey were calculated on per capita basis.

in Table 27, and Figure 2, the domains that contributed most to women's disempowerment in the FTF ZOI were limited decision-making in agricultural production (30.6%), time burden (29.4%), and lack of control over resources (22%). About 60 percent of the women in the survey were not empowered, and had little autonomy in production. Thirty seven (37) percent of the women were not empowered and had excessive workload, while about 50 percent were not empowered and lacked access to credit and the ability to make decisions about it.

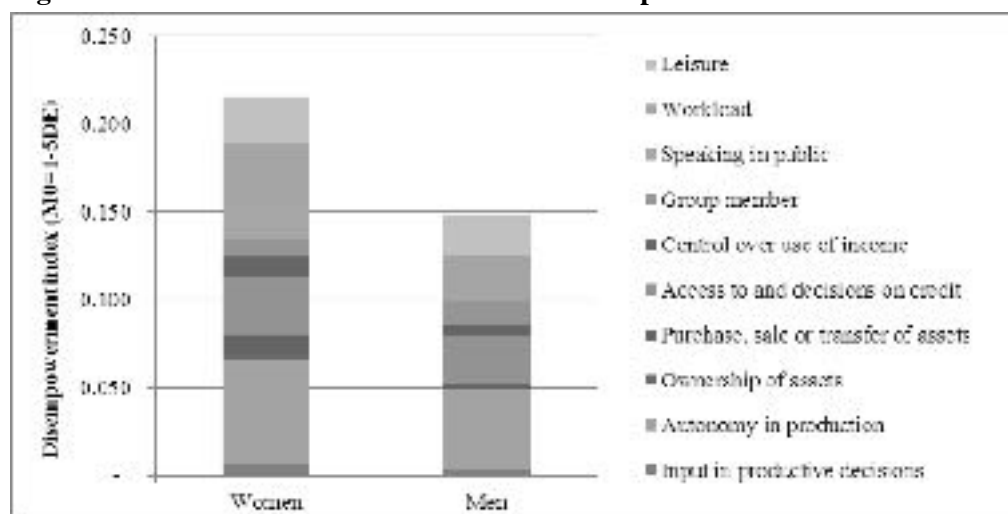
The domains that contributed most to women's disempowerment appear similar to those for men, namely limited decision-making in agricultural production (32.7%), time burden (30.2%), and lack of control over resources (20.5%). Also, the configurations of men's deprivations in empowerment are not strikingly different from women's. Little autonomy in production, lack of access to credit and the ability to make decisions about it, as well as time burden were major constraints in men's empowerment. The main difference is that while speaking in public contributed more to women's disempowerment in the leadership domain, lack of group membership was more important for men (Table 25 and Figure 2). Also, while the time domain contributed similar percentage to disempowerment of women and men (29.4% versus 30.2%), women had excessive workloads and men were more dissatisfied with their leisure. Both men and women reported little disempowerment in control over use of income.

**Table 27: 5DE decomposed by dimension and indicator**

Statistics	Production		Ownership of assets	Resources		Income	Leadership		Time	
	Input in productive decisions	Autonomy in production		Purchase, sale or transfer of assets	Access to and decisions on credit	Control over use of income	Group member	Speaking in public	Workload	Leisure
Indicator weight	0.10	0.10	0.0667	0.0667	0.0667	0.20	0.10	0.10	0.10	0.10
<b>Women</b>										
Censored headcount	0.060	0.598	0.054	0.158	0.497	0.057	0.100	0.177	0.370	0.262
% Contribution	2.8%	27.8%	1.7%	4.9%	15.4%	5.3%	4.6%	8.2%	17.2%	12.2%
Contribution	0.006	0.060	0.004	0.011	0.033	0.011	0.010	0.018	0.037	0.026
% Contribution by dimension	30.6%			22.0%		5.3%	12.8%		29.4%	
<b>Men</b>										
Censored headcount	0.037	0.450	0.007	0.043	0.407	0.033	0.142	0.039	0.213	0.237
% Contribution	2.5%	30.2%	0.3%	1.9%	18.2%	4.4%	9.5%	2.6%	14.3%	15.9%
Contribution	0.004	0.045	0.000	0.003	0.027	0.007	0.014	0.004	0.021	0.024
% Contribution by dimension	32.7%			20.5%		4.4%	12.2%		30.2%	



**Figure 2: Contribution of each indicator to disempowerment**



#### 4.2.2. Relationship between Women's Empowerment and Economic Status

Relationship between women's empowerment and poverty status and expenditure are presented in Table 28. Poverty status was significantly associated with empowerment for men and women. The proportion of empowered women and men was higher in non-poor than in poor households, and the converse was true. Forty one (41) percent of women and 56 percent of men in non-poor households were empowered compared to 33 percent and 52 percent, respectively, in the poor category. Household expenditure was also significantly associated with empowerment. The proportion of empowered women increased up the expenditure quartiles. Conversely, the percentage of disempowered women is skewed towards the lower expenditure quartiles. This suggests that greater household expenditure (proxy for permanent income) is associated with increased empowerment.

**Table 28: Relationship between empowerment and poverty**

Economic status	Empowered			
	Women		Men	
	Yes	No	Yes	No
<b>Poverty</b>				
Non-poor	40.5	59.5	56.3	43.7
Poor	33.3	66.7	51.6	48.4
Total	37.4	62.6	54.4	45.7
N	780	1277	675	549
Pearson Chi <sup>2</sup> (Statistic and p-value)	17.956	0.0020	7.143	0.082
<b>Expenditure Quartile</b>				
1 <sup>st</sup>	29.9	70.1	48.0	52.1
2 <sup>nd</sup>	38.1	61.9	53.3	46.7
3 <sup>rd</sup>	36.3	63.7	51.1	48.9
4 <sup>th</sup>	43.3	56.8	61.6	38.5
Total	37.4	62.6	54.4	45.7
N	780	1277	675	549
Pearson Chi <sup>2</sup> (Statistic and p-value)	5.2	0.0027	3.7	0.0153

### 4.2.3. Relationship between Women's Empowerment and Dietary Diversity

The mean dietary diversity score was significantly associated with women's empowerment. The women who were empowered had significantly greater dietary diversity than their counterparts (Table 29).

**Table 29: Relationship between women's dietary diversity and empowerment**

Dietary diversity score	Empowered	
	Yes	No
Mean	4.2***	3.9***
Std deviation	1.14	1.14
N	762	1238

Statistically significant at the 10% (\*) 5%(\*\*) or 1%(\*\*\*) levels

### 4.2.4. Relationship between WEAI Decision-Making Indicators and Child Dietary Diversity

Table 30 shows the relationship between women empowerment with respect to various indicators and percentage of children 6-23 months with minimum dietary diversity. The proportion of children with minimum dietary diversity was higher for empowered (percent achieving indicator) than non-empowered women for all decision-making indicators but was statistically significant with respect to autonomy in production; decisions on purchase, sale and transfer of assets; and access to and ability to make decisions about credit.

**Table 30: Relationship between WEAI decision-making indicators and proportion of children 6-23 months with minimum dietary diversity**

Domain	Indicator	Empowered (achieving indicator) (N=481)	
		Yes	No
<b>PRODUCTION</b>	Input in productive decisions	31.2	30.9
	Autonomy in production	38.2**	27.9**
<b>RESOURCES</b>	Ownership of assets	31.7	24.5
	Purchase, sale, or transfer of assets	34.2**	22.1**
	Access to and decisions on credit	37.7**	26.4**
<b>INCOME</b>	Control over use of income	31.9	23.0

Statistically significant at the 10% (\*) 5%(\*\*) or 1%(\*\*\*) levels

Although the proportion of children 6-23 months receiving minimum acceptable diet was higher for empowered than non-empowered women for all decision-making indicators, the difference was statistically significant only with respect to decisions on purchase, sale and transfer of assets (Table 31).

**Table 31: Relationship between WEAI decision-making indicators and proportion of children 6-23 months receiving minimum acceptable diet**

Domain	Indicator	Empowered (achieving indicator) (N=409)	
		Yes	No
<b>PRODUCTION</b>	Input in productive decisions	26.4	31.7
	Autonomy in production	31.7	24.6
<b>RESOURCES</b>	Ownership of assets	26.8	27.1
	Purchase, sale, or transfer of assets	28.2	22.6
	Access to and decisions on credit	31.6**	23.5**
<b>INCOME</b>	Control over use of income	27.6	19.7

Statistically significant at the 10% (\*) 5%(\*\*) or 1%(\*\*\*) levels

#### 4.2.5. Relationship between Women's Empowerment and Household Hunger Scale

The relationship between women empowerment and household hunger scale was statistically significant (Table 32). The percentage of empowered women was lower in households reporting higher hunger scales.

**Table 32: Relationship between women empowerment and household hunger scale**

Hunger scale	Empowered	
	Yes	No
Little to no hunger	38.6	61.4
N	683	1073
Moderate hunger	32.7	67.4
N	93	178
Severe hunger	6.8	93.2
N	4	26
Total	37.4	62.6
N	780	1277
Pearson Chi <sup>2</sup> (Statistic and p-value)	14.417	P = 0.0014

#### 4.2.6. Relationship between WEAI Decision-Making Indicators and Poverty Levels

The relationship between decision indicators of women empowerment and poverty are presented in Table 33. The percentage of empowered women was statistically significantly higher in non-poor households than in poor households for all indicators except input in productive decisions. This suggests that women in non-poor households were more empowered in most decision-making indicators compared to their counterparts in poor households.

**Table 33: Relationship between decision indicators and poverty**

Domain	Indicator	Percent of women achieving indicator (N=2057)	
		Non-poor	Poor
<b>PRODUCTION</b>	Input in productive decisions	94.7	93.1
	Autonomy in production	42.5**	37.0**
<b>RESOURCES</b>	Ownership of assets	95.7**	93.2**
	Purchase, sale, or transfer of assets	85.9**	82.0**
	Access to and decisions on credit	54.4***	44.7***
<b>INCOME</b>	Control over use of income	95.1*	93.2*

Statistically significant at the 10% (\*) 5%(\*\*) or 1%(\*\*\*) levels

#### 4.2.7. Relationship between Women's Empowerment and Asset Levels

The association between women empowerment and asset levels is presented in Table 34. Household asset value was computed as the sum of the reported values of all durable goods owned by the household. Overall, asset wealth was significantly associated with empowerment.

The percentage of empowered women increased up the asset quartiles. However, more than half of the women in the richest quartile were not empowered.

**Table 34: Relationship between women empowerment and asset levels**

Asset quartile	Empowered		
		Yes	No
1 <sup>st</sup>	%	26.1	73.9
	N	150	388
2 <sup>nd</sup>	%	37.1	62.9
	N	189	329
3 <sup>rd</sup>	%	41.6	58.4
	N	214	299
4 <sup>th</sup>	%	45.7	54.4
	N	227	261
Total	%	37.4	62.6
	N	780	1277
Pearson Chi <sup>2</sup> (Statistic and p-value)		47.596	P = 0.0000

#### 4.2.8. Relationship between Women's Empowerment and Consumption Expenditure

Per capita expenditure and empowerment were positively correlated. Empowered women had significantly higher mean per capita expenditure compared to their non-empowered counterparts (Table 35).

**Table 35: Relationship between per capita expenditure and women's empowerment**

Per capita expenditure (KES/day)	Empowered	
	Yes	No
Mean	140***	130***
Std deviation	120	107
N	780	1277

Statistically significant at the 10% (\*) 5%(\*\*) or 1%(\*\*\*) levels

### 4.3. Relationship between Dwelling Characteristics and Poverty

The dwelling characteristics of households by poverty status based on the national poverty line of KES 94.75/day is presented in Table 36. The most common roofing material was corrugated metal among both poor and non-poor households (81% versus 92%). A reasonable percentage (18.6%) of poor households also used grass, vegetable materials or sticks to roof their houses.

About 86 percent of poor and 59 percent of non-poor households had houses with floor material being earth/mud/cow dung, while 38 percent of non-poor households used concrete/cement as floor materials. Similarly, majority of poor households (75%) used earth/mud/cow dung for house exterior walls, while 12 percent used tiles/bricks. Among non-poor households, 51 percent used earth/mud/cow dung, while 21 percent used concrete/cement and the remaining ones mainly used tile/bricks and wood. On average, non-poor households had significantly more rooms in the main dwelling.

**Table 36: Dwelling Characteristics by poverty status**

	Non-poor	Poor	Overall
<b>Roof material (%)</b>			
Tile	0.6	0.1	0.4
Corrugated metal	91.9	81.1	87.6
Plastic sheeting	0.5	0.1	0.4
Thatched /vegetable matter /sticks	6.9	18.6	11.6
<b>Floor material (%)</b>			
Earth /mud /cow dung	59.1	85.9	69.8
Concrete /cement	37.9	13.1	28.0
Tile /bricks	2.0	0.8	1.5
Wood	1.0	0.2	0.7
<b>Exterior walls material (%)</b>			
Earth /mud /cow dung	51.1	74.7	60.5
Concrete /cement	21.0	7.6	15.7
Tile /bricks	14.1	12.2	13.4
Wood	13.1	5.3	10.0
Iron sheets	0.6	0.2	0.5
<b>Number of rooms in main dwelling</b>			
Mean	2.7***	2.3***	2.5
Std. Dev.	1.3	1.0	1.2

Statistically significant at the 10% (\*) 5%(\*\*) or 1%(\*\*\*) levels

### 4.4. Relationship between Primary Respondent's Characteristics and Nutrition

This sub-section examines the relationship between age and education of the primary respondent and various indicators of nutrition at the household level. Both age and education of primary respondent were not statistically related to young child feeding in terms of minimum dietary diversity and minimum acceptable diet for children 6-23 months of age (Tables 37 and 38).

**Table 37: Relationship between age of primary respondent and young child feeding**

Age group	% of children 6-23 months with minimum dietary diversity			% of children 6-23 months receiving minimum acceptable diet		
	N	Yes	No	N	Yes	No
25 or below	130	27.9	72.2	114	26.8	73.2
26-35	180	29.5	70.5	153	25.2	74.8
36-45	102	26.6	73.4	81	23.9	76.1
46-55	53	47.7	52.3	43	34.9	65.2
56-65	25	17.2	82.8	23	9.6	90.4
Above 65	24	37.8	62.2	17	37.4	62.6
Total	514	30.2	69.8	431	26.1	74.0
Pearson Chi <sup>2</sup> (Statistic and p-value)	11.193	P = 0.1286		6.330	P = 0.4076	

**Table 38: Relationship between education of primary respondent and young child feeding**

Education level	% of children 6-23 months with minimum dietary diversity			% of children 6-23 months receiving minimum acceptable diet (N=1038)		
	N	Yes	No	N	Yes	No
Less than primary/ No school	58	28.8	71.2	49	26.0	74.0
No formal education						
Primary	351	28.7	71.3	298	25.3	74.7
Secondary	88	34.9	65.1	72	29.9	70.1
Technical/Vocational	3	72.4	27.6	3	72.4	27.6
Tertiary after Secondary	12	37.1	62.9	7	10.7	89.3
University or above	2	0.0	100.0	2	0.0	100.0
Total	514	30.2	69.8	431	26.1	74.0
Pearson Chi <sup>2</sup> (Statistic and p-value)	5.151	P = 0.4967		5.801	P = 0.3800	

Age of the primary respondent was not significantly related to household hunger (Table 39). However, the relationship between education of primary respondent and household hunger was statistically significant (Table 40). A higher percentage of primary respondents in households that reported higher hunger scales (moderate and severe hunger), were classified as having no formal education, less than primary education, while others had attained just primary education.

**Table 39: Relationship between age of primary respondent and household hunger**

Age group	N	% of households with...		
		Little to no hunger	Moderate hunger	Severe hunger
25 or below	281	91.3	8.7	0.0
26-35	603	85.3	12.6	2.1
36-45	488	87.4	10.6	2.1
46-55	417	86.6	13.0	0.3
56-65	294	85.6	13.2	1.3
Above 65	282	83.5	14.4	2.1
Total	2365	86.5	12.1	1.4
Pearson Chi <sup>2</sup> (Statistic and p-value)	18.340	P = 0.1235		

**Table 40: Relationship between education of primary respondent and household hunger**

Education level of primary respondent	N	% of households with...		
		Little to no hunger	Moderate hunger	Severe hunger
Less than primary/ No school	403	80.4	17.8	1.8
No formal education	21	79.4	20.6	0.0
Primary	1421	85.5	12.8	1.7
Secondary	387	92.6	6.8	0.6
Technical/Vocational	25	96.3	3.7	0.0
Tertiary after Secondary	79	100.0	0.0	0.0
University or above	27	97.0	3.0	0.0
Total	2363	86.5	12.1	1.4
Pearson Chi <sup>2</sup> (Statistic and p-value)	46.296	P = 0.0017		

#### **4.5. Relationship between Household Per Capita Expenditure and Selected FTF Indicators**

Table 41 shows how various selected household indicators vary across quartiles and deciles of household per capita expenditure. Prevalence of households with moderate or severe hunger decreased up the quartiles of per capita expenditure, and differences across the quartiles were statistically significant. The proportion of households that reported moderate or severe hunger was 10 times more in the bottom per capita expenditure decile than the top decile.

There was no significant difference in percentage of children 6-23 months with minimum acceptable diet across the per capita expenditure quartiles. However, there was a higher proportion of children with minimum acceptable diet in the top expenditure decile compared to the bottom decile.

Women's dietary diversity score increased with increase in per capita expenditure and the inter quartile differences in diversity score were statistically significant. Prevalence of exclusive breastfeeding was 54 and 30 percent in the top and bottom expenditure deciles, respectively. It also differed significantly across expenditure quartiles, being highest in the top quartile and lowest in the second quartile. Women's empowerment in agriculture index (WEAI) generally increased up the expenditure quartiles.

**Table 41: Selected indicators by categories of per-capita expenditure**

Indicator	Quartiles				Interquartile difference (significance level)	Deciles	
	1	2	3	4		Top	Bottom
Prevalence of HH with moderate or severe hunger (HHS)	24.9	16.6	11.8	5.7	****	3.1	30.0
Prevalence of children 6-23 months with minimally acceptable diet	19.8	30.8	30.0	25.8	ns	31.5	15.5
Women's dietary diversity score	3.6	4.1	4.2	4.4	****	4.4	3.2
Prevalence of exclusive breastfeeding	42.6	35.4	49.0	73.8	*	54.4	30.1
Women's empowerment in agriculture index	0.766	0.800	0.795	0.819	na	0.848	0.763

Statistically significant at the 10% (\*) 5%(\*\*) or 1%(\*\*\*) levels

Notes: ns=not significant, na=not tested



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## Errata (July 20 17)

### Kenya Feed the Future Zone of Influence Baseline Report (May 20 13)

This addendum revises the population numbers in Table 1 of the Kenya Feed the Future Zone of Influence Baseline Report. The original table reported the 20 0 9 population as captured by the Kenya Population and Housing Census. The revised table, included in the errata, adheres to the guidance and reports the 20 13 projected population. The updated numbers are based on projections carried out and published by the Kenya National Bureau of Statistics (KNBS).

The revised table provides the required population categories which were missing from the original report. Where estimates of the ZOI population by categories were not given, we used the survey data to construct the estimates. As the anthropometric data was collected by the 20 0 8-20 0 9 Kenya Demographic and Health Survey, DHS survey proportions were used to estimate the women of reproductive age category.

## Feed the Future Southern Kenya 2013 Population of Individuals, by Category in the ZOI

Category of individuals	HR1	SA2	Total
<b>Total population</b>	<b>15,517,057</b>	<b>5,287,297</b>	<b>20,804,354</b>
<b>Total population, by subpopulation</b>			
Women of reproductive age (15-49 years)	3,275,823	1,169,336	4,445,159
Children 0-59 months	2,261,057	611,487	2,872,544
Children 0-5 months	208,536	49,042	257,578
Children 6-23 months	619,040	199,231	818,272
Children 6-59 months	2,052,521	562,446	2,614,967
<b>Total number of households, by type of household</b>			
Male and female adult households	1,917,776	703,363	2,621,140
Female adults only households	354,027	81,789	435,816
Male adults only households	82,850	45,288	128,138
<b>Total population, by gendered household type</b>			
Male and female adult(s)	13,413,634	4,773,893	18,187,527
Female adult(s) only	1,860,405	392,333	2,252,738
Male adult(s) only	243,018	121,071	364,090
<b>Women of reproductive age, by pregnancy status</b>			
Non-pregnant	3,189,014	1,151,094	4,340,108
Pregnant	83,206	18,242	101,448
<b>Children 0-59 months, by child sex</b>			
Male	1,113,287	317,238	1,430,525
Female	1,147,770	294,250	1,442,019
<b>Children 0-5 months, by child sex</b>			
Male	114,941	26,053	140,995
Female	93,595	22,988	116,583
<b>Children 6-23 months, by child sex</b>			
Male	303,773	91,953	395,726
Female	315,267	107,278	422,546
<b>Children 6-59 months, by child sex</b>			
Male	998,346	291,184	1,289,531
Female	1,054,175	271,261	1,325,436

Source: Population projections are based on reports by KNBS. The numbers are published in the analytical report volume XIV. The proportion of demographic categories is calculated from the survey data carried out in 2013. Population proportions are applied to the projected numbers to get estimated population numbers in the ZOI. For the categorization of women of reproductive age by

pregnancy status, we have used estimated from the 2008-2009 Kenya Demographic and Health Survey. This information was not collected in the 2013 baseline survey.