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Poverty Assessment in Rural Kenya: Explaining Trends in FTF ZOI

Technical Report

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Abbreviations

AI	Artificial Insemination
EA	Enumeration Area
EPSM	Equal Probability Selection Method
FTF	Feed the Future
FTFS	Feed the Future Strategy
GDP	Gross Domestic Product
GHFSI	Global Hunger and Food Security Initiative
HDI	Human Development Index
HR 1	High Rainfall area 1
HH	Household
KIHBS	Kenya Integrated Household Budget Survey
KNBS	Kenya National Bureau of Statistics
MPI	Multidimensional Poverty Index
NASSEP	National Sample Survey and Evaluation Programme
NCPB	National Cereals and Produce Board
OPHI	Oxford Poverty and Human Development Index
PPP	Purchasing Power Parity
PBS	Population Based Survey
SA 2	Semi-Arid area 2
TAPRA	Tegemeo Agricultural Policy Research and Analysis
USAID	United State Agency for International Development
USA	United States America
ZOI	Zone of Influence

Executive Summary

This study examines determinants, trends and dynamics of rural poverty in Kenya using data collected in 2013 and 2015 from USAID's Feed the Future (FTF) program zones of influence, Two methods are pursued in this study. The first uses the conventional poverty line based on expenditure approach, while the other uses the Multidimensional Poverty Index Approach. Results of the descriptive analysis show that socio-economic indicators play an important role in household poverty incidence. Households with lower level of education attainment, lower literacy level of the head, or are female-headed have a higher probability of falling into poverty than households with both male and female adults.

The regression results show that poverty is likely to be higher among households with higher dependency burden. While the share of own production in the food consumption expenditure is found to reduce the probability of a household falling into poverty in the pooled and the year 2015 model, it increases the chances of households falling into poverty in year 2013 survey. The study also shows that poverty incidences are negatively correlated with household physical asset wealth. Results further show that the probability of a household falling into poverty increased in the year 2015 compared to 2013, and that the probability of a household falling into poverty are lower in Semi-Arid (SA2) zone of Influence compared to the High Rainfall (HR1) zone of influence.

With regard to poverty dynamics, results indicate that in 2015, the MPI poverty rate was about 35 percent of the population in the FTF zone of influence. This rate was higher in in HR1 (39%) compared to SA2 (26%). However, the average intensity of deprivation was, on average higher in SA2 (46.5%) compared to HR1 (42.7%). The overall MPI index, which is a product of percent of poor people and average intensity of poverty was 0.15 implying that the poor in FTF-ZOI experiences $3/20^{th}$ of the deprivation that would that would be experienced if all people in FTF-ZOI were deprived in all the indicators. The living standard dimension has the highest contribution to MPI poverty followed by health. These findings have key implications on addressing rural poverty from a program perspective

1 Background and objectives of the study

1.1 Introduction

Rural poverty in Sub-Saharan Africa (SSA) continues to be a key developmental challenge. Majority of rural population have limited access to basic social infrastructure (such as education and schools, economic opportunities, especially off-farm employment, high costs of production, modern technology and inputs for agricultural production, and markets. Because of this, many governments and developing partners have concentrated their effort on reducing rural poverty and transforming lives of rural farm households.

Whereas several studies have been undertaken on poverty trajectories in Kenya, few report on the dynamics of poverty or provide an in-depth analysis on the drivers and dynamics of rural poverty. Estimates of poverty and inequality rates for Kenya were last published in 2005/06 based on the Kenya Integrated Household Budget Survey (KIHBS)[1]. Over the years, different organisations have estimated poverty incidences using various approaches and the outcomes have been varied. For example, the World Bank estimated national incidence of poverty (headcount ratio) to be 42% in 2013, while the Kenya Institute for Public Policy Research and Analysis (KIPPRA) estimated the rate to be 49% in 2014. [2] Officially, the Kenya National Bureau of Statistics (KNBS) has provided estimates based on projection models and small area forecasts.

At program level, there is little evidence about the contribution of various projects to poverty alleviation. Against this background, the Feed the Future (FTF) initiative engaged Tegemeo Institute of Agricultural Policy and Development to undertake a study to determine the impact of its programs on the rural livelihoods and poverty alleviation. Repeated cross-sections of household level data were collected in 2013 and 2015, providing information on aggregate expenditure among other variables. The data was collected in High Rainfall (HR1) and Semi-Arid (SA2) two regions zones of influence (ZOI), where the FTF programs were being implemented (Figure 1). An expenditure approach was used to estimate poverty levels, based on a poverty line of $1.25 a day.

[1] A household budget survey was carried out by the KNBS in 2015/16 and new poverty numbers are expected late 2016 or early 2017.

[2] Poverty level in 2005/06 was estimated at 46% nationally, with 34% of those in urban and 49% of rural households being poor. The poverty line was set as Ksh1, 562 per adult equivalent per month for households in rural areas and Ksh.2,913 per adult equivalent per month for households in urban areas. In addition, food poverty, described as consumption of food items required to meet a daily consumption of 2,250 kilocalories per adult equivalent per day, had the poverty line set as Ksh.988 per adult equivalent per month for households in rural areas and Ksh1,474 per adult equivalent per month for households in urban areas.

Poverty in 2013 was estimated at 45% while in 2015 it was estimated at 50%. However, when disaggregated by geography and categories of households, the change in poverty level was insignificant. HR1 had significantly higher incidence of poverty than SA2 in both years.

1.2. The Kenya Feed the Future Initiatives in Kenya

The Feed the Future (FTF) program is the United States of America (USA) government's Global Hunger and Food Security Initiative (GHFSI) whose goal is to sustainably reduce hunger and poverty through investments that transform Kenya's agriculture by improving the competitiveness of high-potential value chains and promoting diversification to higher-return agricultural enterprises and off-farm activities. In Kenya, the United States Agency for International Development (USAID) Kenya Mission oversees programs implemented through the FTF's five-year strategy for the Initiative. The aim of the investments is to transform smallholder agriculture into commercially oriented agriculture and create a direct linkage to improvement in nutrition. Therefore, a fundamental contribution to the programs is upscaling what works for rural poor households. The FTF goals are achieved by attaining two broad objectives, namely: (i) inclusive agricultural sector growth; and (ii) improved the nutritional status of women and children.[3] The program's success is measured by its contribution to reducing the proportion of people living in extreme poverty and suffering from hunger.

The FTF initiative theorizes that agricultural transformation is a necessary but not sufficient condition to reduce poverty and hunger. Improving links to markets and input access, providing affordable business development and financial services, and promoting greater diversification, specifically tailored to the needs of smallholders, women and youth will help attain sufficient conditions for achieving the FTF goal (US Government 2011). Two key mechanisms are used in pursuit of the goal and objectives of the FTF program. First, activities aimed at improving the nutritional status of households, sustainable natural resource management and improving access to knowledge can help households transform to their farming to be market oriented. Second, improving access to input access, linking households to markets, providing affordable business development and financial services, and promoting greater diversification for households can

[3] Indicators that capture key steps in achieving these objective and goal are described in the Feed the Future Results Framework

improve the competitiveness of the selected value chains and provide a rich environment for growth.

The Kenya FTF Strategy focuses its farmer/household activities on production and post-harvest handling in the HR1 and SA2 zones of influence, 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). Also, pulses, an important source of plant protein, are widely grown in SA2 and have received 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.

1.3. Study Area

The Kenya FTF programs are implemented through a focus on geographical regions. These areas are known as the Zones of Influence (ZOI). The ZOIs were picked through a series of filters such as levels of poverty, staple food production and ethnic diversity. In Kenya, there are two ZOIs for the FTF program: high rainfall area 1 (HR1) and semi-arid area 2 (SA2) (see Figure 1). These two regions span 22 Counties of Kenya and are characterised by the high agricultural output[4] in their respective ecological zones; a large number of rural poor; low incomes per household; and a high number of malnourished children. These characteristics offer the best opportunities for linking growth and poverty reduction, while at the same time ensure that investments under the FTF program reach a more diverse population.

The demographic profile describing population size of various age groups for women and children nationally and within the ZOI based on the 2009 Kenya demographic and population census, is presented in Table 1. The population in the ZOI represented about 48 percent of the 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.

[4] Agricultural output, in this study, refers to the quantity of food (kg) produced per household

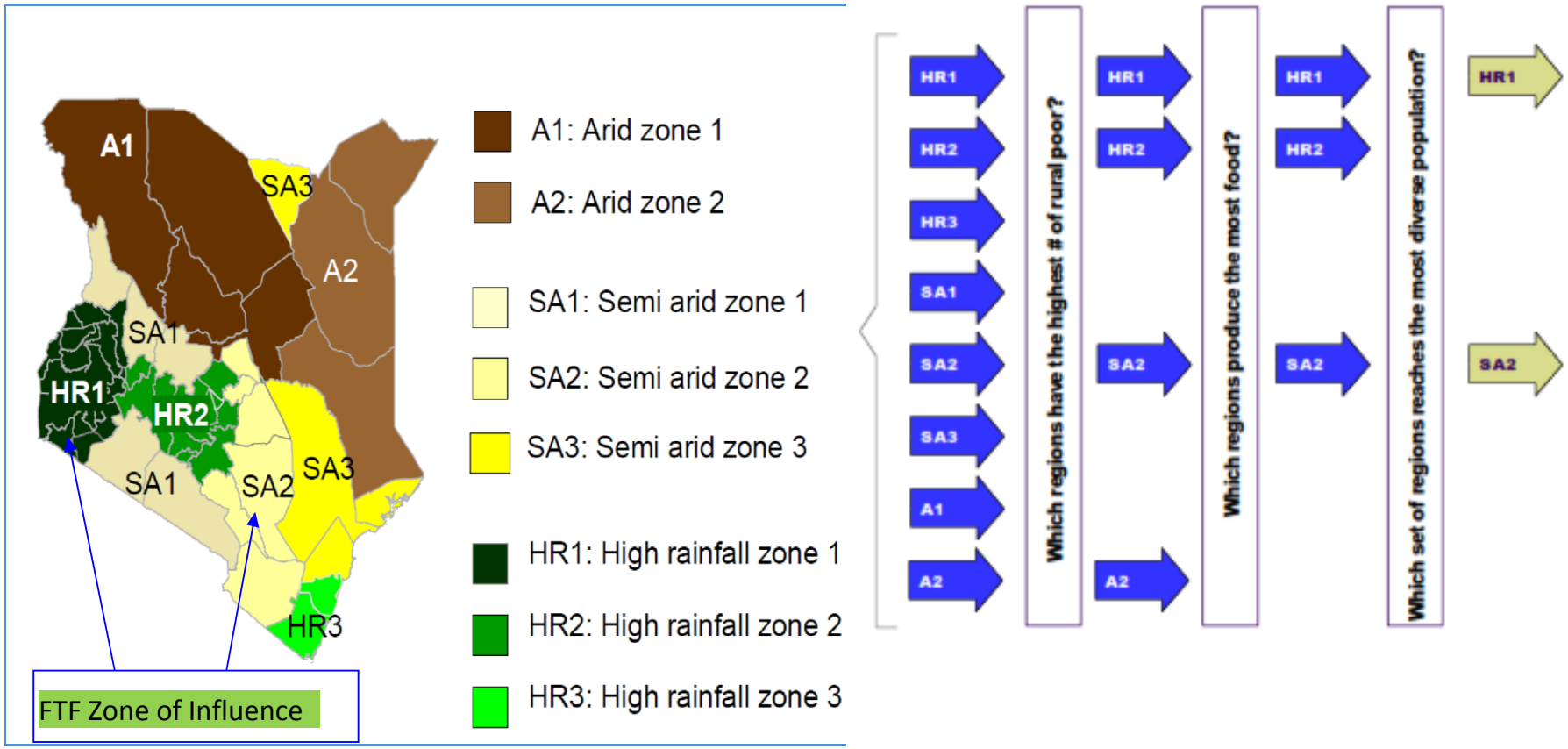
Table 1: Total, rural and urban population numbers nationally and within the ZOI

	Population			
	National	ZOI		Total ZOI
		HR1	SA2	
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 yrs)	9,375,784	3,288,768	1,181,188	4,469,956
Rural	5,863,055	2,432,514	904,867	3,337,381
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	3,000,439	1,160,032	351,010	1,511,042
Females	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	2,383,596	912,769	296,768	1,209,537
Females	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	616,843	247,263	70,154	317,417
Females	605,094	243,305	69,076	312,381
Children 0-23 months	2,280,015	921,227	262,110	1,183,337
Males	1,152,512	465,291	132,310	597,601
Females	1,127,503	455,936	129,800	585,736

Note: The population for each ZOI is obtained by aggregating at the administration level (County level). This may be higher than actual number of people receiving FTF interventions

Source*: The* Republic of Kenya, 2009

Figure 1: Kenya FTF Zones of Influence



Source: US Government, 2011

Table 2 shows distances in kilometres to nearest infrastructural facilities and services by ZOI[5]. In general, households in SA2 are further located from most infrastructural facilities and services compared to the national averages while households in HR1 are located nearer to key infrastructure and services. Thus Since households in SA2 are located further from infrastructure facilities such as roads and markets; they have to travel the longest distances to access services such as extension advice.

Table 2: Access to Infrastructure and Services (in Kilometers) by Zones of Influence

Infrastructure/Service	National	HR1	SA2
Distance to:			
Fertilizer seller	4.3	3.3	4.8
Hybrid maize seed seller	4.3	3.3	5.1
National Cereals and Produce Board (NCPB) depot	24.2	21.3	31.9
Extension advice	7.6	6.3	9.7
Veterinary service	5.2	4.3	6
Artificial Insemination (AI) service	6.8	5.6	9.2
Piped water	3.3	3.5	5.2
Electricity supply	1.6	1.1	2.8
Health Centre	2.8	2.3	3.7
Motorable road	0.4	0.4	0.5
Tarmac road	9.5	6.9	13.9
Marketplace for farm produce	4.3	3.3	5.2
Marketplace for Livestock	9.2	7.1	10.9

Source: TAPRA 2014 Survey

1.4. Objectives of the study

The goal of this study is to contribute to knowledge about drivers and dynamics of poverty in rural areas in which the FTF programs are situated. This knowledge would provide a valuable feedback to the Kenya FTF programs on how the benefits from the programs could be tailored to reduce poverty in the areas. With this goal in mind, the study seeks to pursue two objectives. First, we use the repeated cross-section data for a deeper analysis to understand the nature and key drivers of poverty, characteristics of households that are likely to fall into poverty, and areas where poverty is

[5] To gain insights about access to key infrastructure and services within these zones of influence, we used the Tegemeo Agricultural Policy Research and Analysis (TAPRA) survey carried out in 2014, which is a nationally-representative dataset.

likely to be persistent. This analysis uses expenditure approach. But since poverty measurement based on income or expenditure only may be inadequate to capture a household's deprivation, we also conduct multidimensional poverty index (MPI) analysis on the households. This approach accounts for attributes such as education, health and other living conditions that are likely to affect a household's poverty status.

2 Data and Methods

Data for this study is based on the two-period synthetic panel survey of households in the In this section, the sampling procedure used and methodology of identifying households for both the 2013 and 2015 surveys are explained. The procedure for constructing a synthetic panel dataset from the two cross-section dataset is described, together with the merits and demerits of this procedure are also discussed.

Sampling Design

The design of the sample survey in 2013 and 2015 was similar, and followed the FTF Monitoring and Evaluation (M&E) guidelines. In each survey wave, the sample was clustered around the FTF ZOIs (HR1 and SA2) which cover 22 counties in Kenya. The design of the sample was structured to collect both household level data and information on select groups of individuals in a family.

Selection of a sample of households followed a two-stage stratified cluster sampling design. In the first stage, a number enumeration areas (EAs) were selected from the fifth National Sample Survey and Evaluation Programme (NASSEP V) household sample frame developed and maintained by the Kenya National Bureau of Statistics (KNBS). These EAs were selected across the 22 counties using Equal Probability Selection Method (EPSEM). In 2013, 105 clusters were chosen, while 113 clusters were selected in 2015. From each cluster, a sample of 25 households was selected using systematic (with random start) sampling methodology. Weights were developed to account for bias that may arise during the selection of clusters and non-response during data collection. Two sets of weights i.e. normalised household weights and normalised population weights were generated. The household weights were applicable on household related variables while population weights were used on individual's variables.

From these two cross–section datasets, a synthetic panel dataset was developed following Dang and Lanjouw (2015) approach. This method is suitable when, despite differences in households interviewed, the sampling strategy used is similar and the same zones were visited each year. The method allows for a greater degree of homogeneity. Also, the approach enables the comparison of subgroups i.e. gendered subgroups while retaining a sample with sufficient statistical power for analysis. Calculation of standard poverty measures is discussed in Annex 1.

3 Poverty Prevalence

Table 3 presents poverty estimates at the $1.25 per day (2005 PPP) threshold. The poverty headcount and poverty gap are shown for all households in the ZOI, as well as disaggregated zones of influence

Table 3: Poverty Headcount and Poverty Gap

Feed the Future Indicator	Baseline (2013)	Interim (2015)	χ^2/t-test
Prevalence of Poverty: Percent of people living on less than $1.25 per day (2005 PPP)			
All households	44.73	46.92	12.3736
HR1	43.71	49.28	46.7054*
SA2	47.40	40.57	49.7780
Poverty Gap: Mean percent shortfall relative to the $1.25 per day poverty line (2005 PPP)			
All households	0.14	0.15	0.67
HR1	0.13	0.16	2.15**
SA2	0.17	0.13	-1.42

*Statistically significant at 90% confidence level, ** statistically significant at 95% confidence level
Source: ZOI interim survey, Kenya 2015

The study shows that 47 percent of individuals in the ZOI live below the $1.25 poverty threshold. This proportion represents a 4 percent increase from the 2013 poverty levels although this increase is not statistically different from zero. The poverty gap for all households in the sample is 15 percent. The 2015 level was not statistically distinct from the 2013 level. In the HR1 zone, poverty headcount increased by 11 percent from 2013 levels to 49 percent, while in the SA2 zone, the headcount ratio declined by 15 percent, although the decline was not statistically significant. Similar trend was observed for the poverty gap. The poverty gap in HR1 was 16 percent of the poverty line, a 23 percent increase. In SA2, the poverty gap fell to 13 percent from 17 percent in 2013. The decline was however not statistically significant.

Table 4 presents poverty estimates at the $1.25 and $1.90 per day (2005 PPP) threshold disaggregated by household type, the size of the household and the level of education of the

primary respondent[6]. In male and female adult households, these mainly would be the husband and wife, but could also be other household members as long as they were aged 18 years and above. In female adult only and male adult only households, however, there was only the primary respondent – either a female/male decision-maker aged 18 years or older.

Among the household types, the male adult households had the least number of individuals living below the $1.25 poverty threshold (28%), with the female only households having the greatest proportion (52%). When we consider the $1.90 poverty line, the head count ratio of male and female adult households and that of female adult only households is very similar. The prevalence of poverty increased with the size of the household. The trend is similar when we use the $1.90 poverty threshold.

Poverty prevalence and gap is inversely correlated with household education. When the data is disaggregated by education attainment, households with secondary level education and above had the least number of individuals living below the $1.25 poverty line, while those who had lower than primary level education had the highest number of individuals living below the threshold.

[6] A primary respondent is the household members responsible for social and economic decision making within a household.

Table 4: Poverty at the $1.25 & 1.90 (2005 PPP) per person per day threshold

Characteristic	$1.25 Poverty Line				$1.90 Poverty Line			
	Poverty Headcount		Poverty gap		Poverty Headcount		Poverty gap	
	Percent population	n	% of poverty line	n	Percent population	n	%of poverty line	n
Total (All households)	46.92	12586	14.85	12586	64.06	12586	24.88	12586
Male and female adults	46.98	11021	14.72	11021	64.58	11021	24.84	11021
Female adult(s) only	51.7	1244	17.74	1244	65.65	1244	27.96	1244
Male adult(s) only	27.99	312	8.62	312	40.91	312	15.20	312
Small (1-5 members)	34.33	4757	9.80	4757	51.36	4757	17.86	4757
Medium (6-10 members)	53.56	6907	17.17	6907	70.50	6907	28.32	6907
Large (11+ members)	57.86	922	21.49	922	76.68	922	32.71	922
No education	17.27	89	4.06	89	36.60	89	9.85	89
Less than primary	63.55	2302	21.78	2302	78.14	2302	33.87	2302
Primary	54.46	5091	17.41	5091	72.38	5091	33.86	5091
Secondary or more	34.06	5104	9.997	5104	51.41	2305	17.96	2305

^ There were no children headed households in the sample;
Source: ZOI interim survey, Kenya 2015

4 Determinants of poverty

In this section, we factors that are driving poverty in 2015 are established with the aim of providing critical feedback for policy or programmatic interventions. Due to data limitations, this section undertakes a descriptive analysis to evaluate the developed hypothesis. Notably, this section takes an expenditure approach to poverty measurement. We establish a correlation between different drivers and whether a household is poor. Additionally, use of econometric analysis is employed to establish the effects of various demographic and socio-economic factors on both food and income poverty. As the households are in rural areas, the extent to which shocks in production and market affect household consumption patterns are explored.

4.1. Characteristics of poor households

The data portrays distinct differences between poor and non-poor households in a range of socio-economic characteristics. Table 5 shows that household poverty status is correlated with the education level of household head (primary respondent). The poverty rate is higher among households headed by individuals with less educational attainment. This is also reflected in the relationship between poverty status and literacy of household head presented in Figure 2; poverty rate is higher among households led by an illiterate head than among those led by educated head.

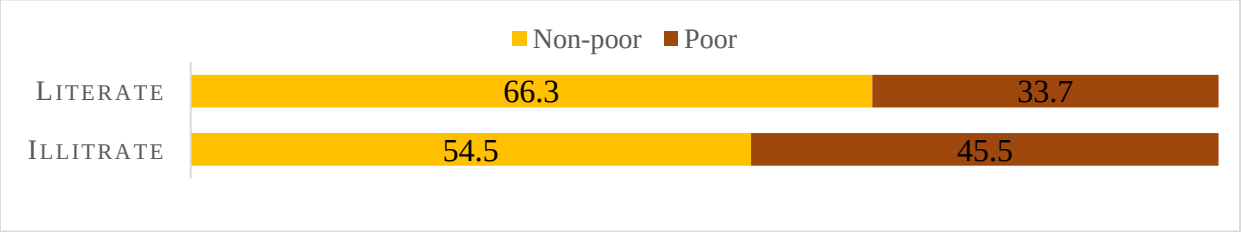
Table 5: Correlation between poverty and education of household head, 2015

HH head's education	Non-poor		Poor		Total	
	No.	%	No.	%	No.	%
None	217	57.3	162	42.7	379	100.0
Primary 1-3	125	52.1	115	47.9	240	100.0
Primary 4-8	714	58.3	511	41.7	1,225	100.0
Secondary	325	79.1	86	20.9	411	100.0
Post-secondary	179	93.2	13	6.8	192	100.0
Total	1,560	63.8	887	36.2	2,447	100.0
Pearson $\chi^2(4) = 150.85$		Pr = 0.000				

Poverty incidence is significantly higher among female-headed households relative to male-headed households (Figure 3). Surprisingly, across household types, the incidence of poverty is highest among households with both male and female adult, than in households with

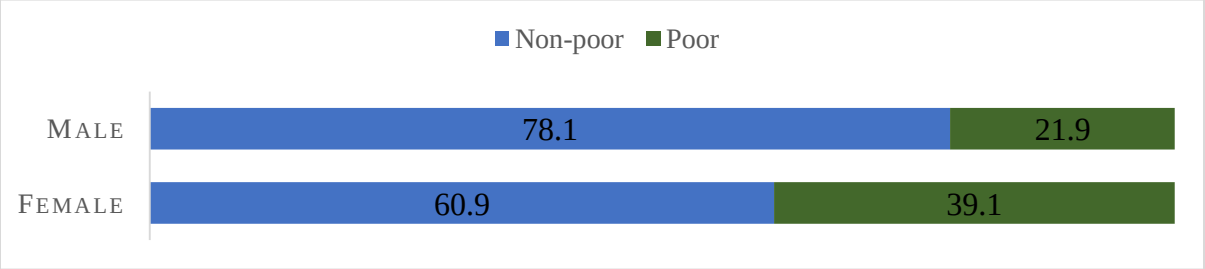
female-only or male-only adult (Figure 4). Nevertheless, poverty incidence among female-only adult households is significantly higher compared to among male-only adult households.

Figure 2: Percent of poor and non-poor HHs by literacy status of head, 2015



Pearson χ^2 (1) = 24.6721 Pr = 0.000

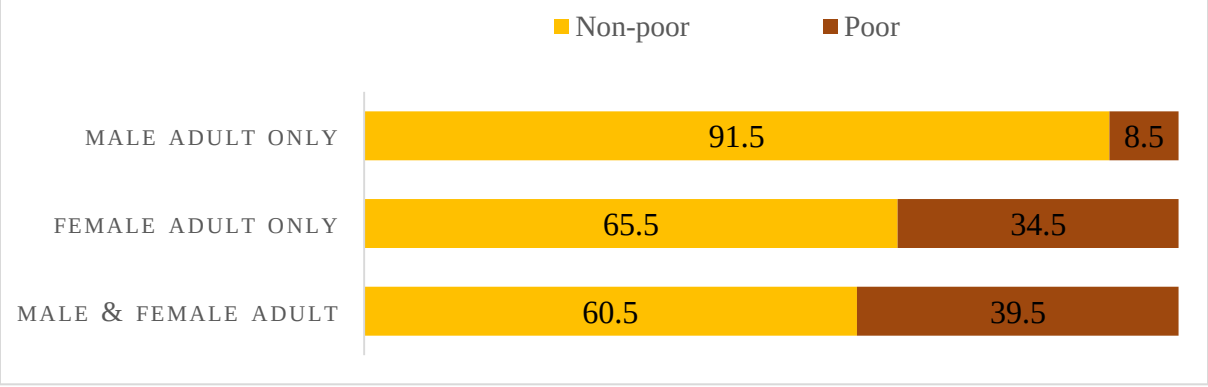
Figure 3: Percent of poor and non-poor HHs by gender of head, 2015



Pearson χ^2 (1) = 44.0211 Pr = 0.000

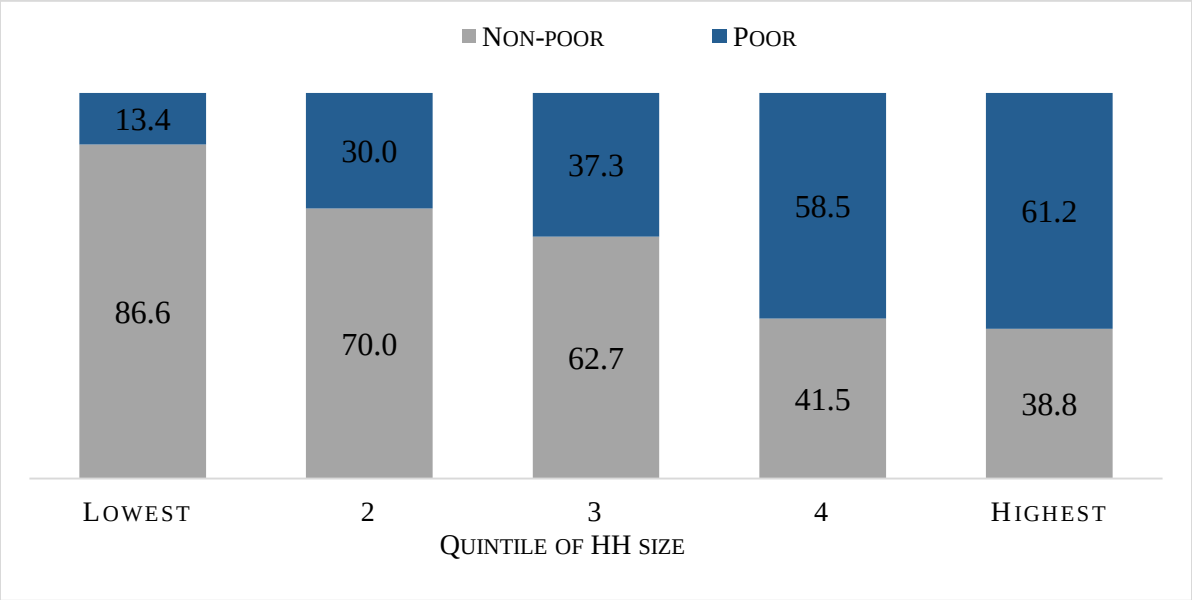
Poverty rates significantly differ by household size (Figure 5), with the incidence of poverty much higher (59-61 percent) among the largest 40 percent of households. Poverty incidence among the 20 percent smallest households is less than 14 percent. These figures suggest that household size has a significant influence on per capita household consumption with larger households consuming less in per capita terms. This would have negative implications for their nutrition. Indeed, data shows that 17-21 percent of households in the largest 40 percent group experienced moderate or severe hunger.

Figure 4: Percent of poor and non-poor HHs by HH type, 2015



Pearson χ^2 (2) = 75.6250 Pr = 0.000

Figure 5: Percent of poor and non-poor HHs across quintiles of HH size, 2015



Pearson chi2 (4) = 318.2683 Pr = 0.000

The proportion of own produced food in household per capita food consumption is lower among poor compared to among their non-poor counterparts (Figure 6). This result indicates that poor households also do poorly in food production and rely more on markets and other sources for their food needs. Whether it is poverty (poor access to factors of production and inputs) that limits their capacity to produce food or it is a low production that drives their being poor remains an empirical question, although both more likely reinforce each other. Poverty is also correlated with hunger as shown in Figure 7; close to one-quarter of poor households compared to nine percent of their non-poor counterparts' experienced moderate or severe hunger. Hunger could be a cause and consequence of poverty. While hunger is likely to severely affect poor households because of lack of physical assets to cushion themselves from food insecurity, hunger itself can drive households deeper into poverty.

Figure 6: Average percent of own produced food in HH per capita food consumption expenditure, 2015

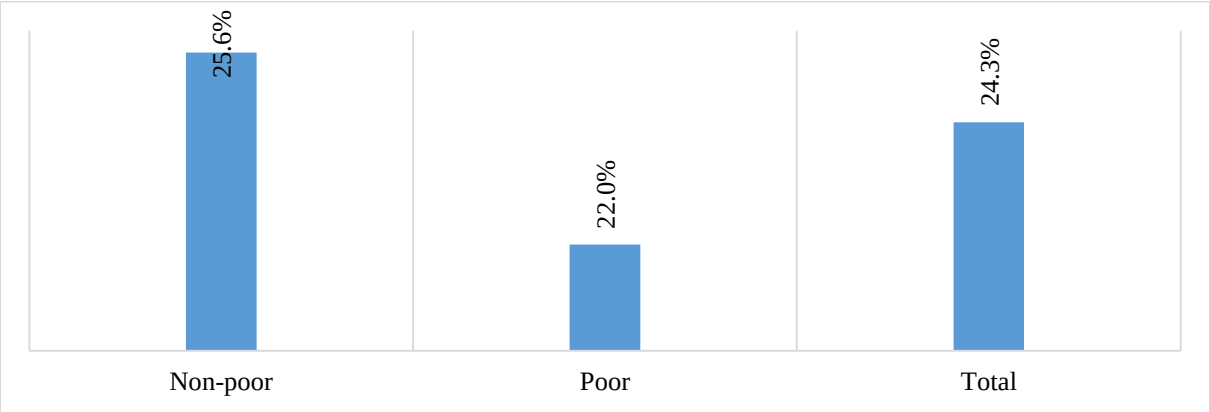
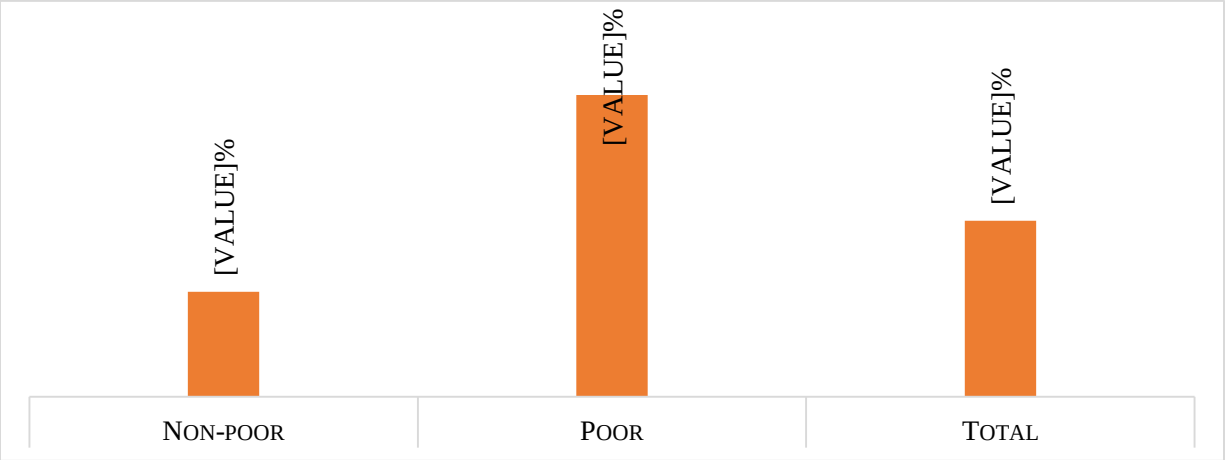


Figure 7: Percent of poor and non-poor HH who experienced moderate or severe hunger, 2015



Pearson χ^2 (1) = 118.7393 Pr = 0.000

Regarding asset ownership, a remarkable result is that a large proportion (81%) of poor households own a cell phone (Figure 8). This is a little less than the percentage of non-poor households who own a cell phone (89%). This suggests that services and information that can be transmitted through a mobile phone can be accessible to a broad base of households. Examples of services and information could be those that relate to agricultural extension, given that these households are primarily agricultural. Also correlated with poverty status are dwelling conditions and sanitation. A lower proportion of poor households compared to their non-poor counterparts have houses built with improved materials, such as iron sheets and tiles (roof), tiles/bricks, concrete/cement/stones and wood (floor) and concrete/cement, tiles/bricks, and wood (wall). Lower proportions of poor

households also have access to safe drinking water and toilet, which are essential facilities for sanitation.

Figure 8: Percent of poor and non-poor HH who own selected assets, 2015

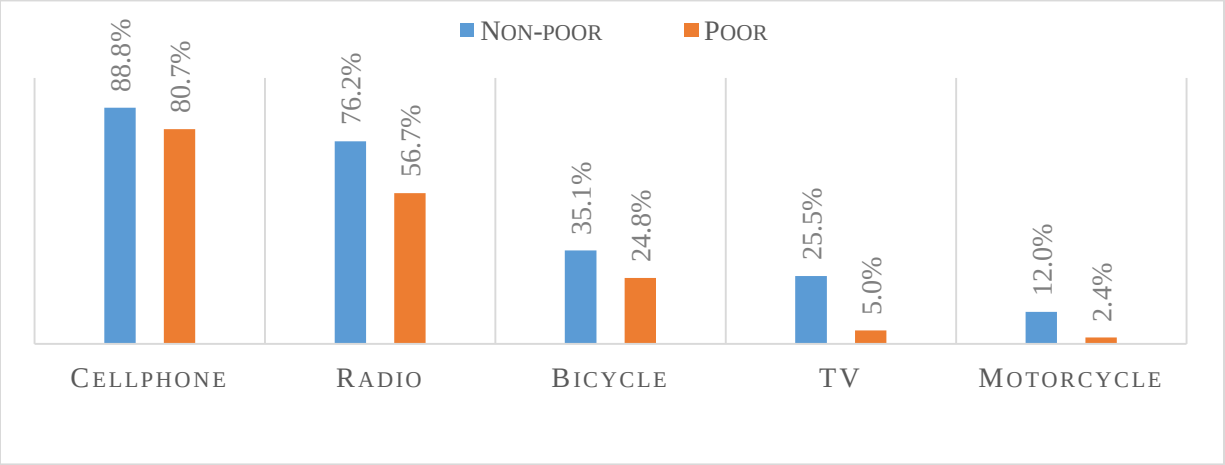
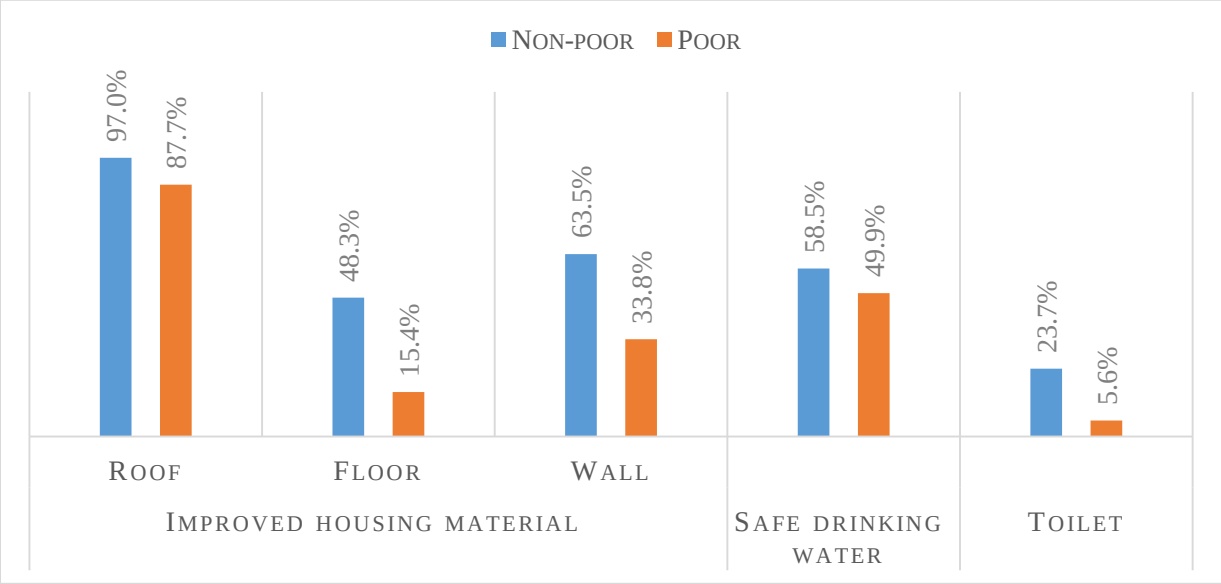


Figure 9: Percent of poor and non-poor HH with improved dwelling and access to toilet and safe drinking water, 2015



4.2. Determinants of Household Expenditure and Poverty

This section presents the econometric estimation results of correlates of household poverty and per capita food expenditure. First, we discuss the results from the probit model estimation of the determinants of poverty incidence. We first run a pooled regression for the 2013 and 2015 survey data with a survey year dummy followed by regressions for each survey year. The numbers presented are the marginal effects and the standard errors in parentheses. It is important to mention two things at the onset of this analysis. First, the results from the pooled model show that the probability of households falling into poverty increased in the year 2015 compared to the year 2013. The likelihood of households to fall into poverty rose by 0.05 in 2015. Second, the chances of households falling into poverty are lower in SA2 compared to the HR1. While the 2013 and 2015 survey data may not explain why this is finding, the emerging evidence from other studies shows unsustainable agricultural trends in high rainfall areas. Factors such as rising population densities, soil degradation due to continued cultivation without fallowing, and soil acidification due to continued application of inorganic fertilisers in soils with low levels of organic carbon (Muyanga and Jayne, 2014) contribute to declining agricultural productivity and ultimately household income. Also, recent climatic shocks and increased incidence of disease and pest outbreak in high rainfall areas contribute to unfavourable trends.

Table 6 shows that poverty incidence is significantly influenced by the household head attributes such as age and education attainment; and household characteristics such as household size and physical assets ownership. Poverty incidence is a decreasing function of the household head's age and education attainment. A ten-year increase in the age of the household head decreases the probability of falling into the poverty of the household by 0.02 in the pooled model and 0.03 in the 2015 model. The inclusion of a square term of the age variable shows that poverty incidence is negative but nonlinear functions of the age of the household head. Increasing age of the household head reduces the probability of the household to fall into poverty up to about 77 years; after that, increasing household age increases chances of the household falling into poverty. Households headed by persons with high education attainment are less likely to fall into poverty. The probability of falling into poverty drops by about 0.13 if the household head has completed secondary education and by about 0.32 if the head has a post-secondary level of education. The base category is 0-2 years of schooling. Similarly, literacy of the household head also matters. For

example in the pooled model, households led by literate persons have about 0.06 chances of falling into poverty.

The results show that poverty is likely to be higher among households with high dependency burden. Households with more members aged below 17 and over 65 years are more likely to fall into poverty compared to those dominated by persons in the 18 to 65 age bracket. This finding is consistent across the three models. males or females only households have a higher chance of falling into poverty than households.

Poverty incidence is negatively correlated with household physical asset wealth. Households owning assets such as cell phones, radios, bicycles, and motorcycles are less likely to drop into poverty. Looking closely at the marginal effects associated with the asset variables, ownership of motorcycles reduces the probability of falling into poverty by the largest magnitude (0.34 in the pooled model and 0.39 and 0.31 in the year 2013 and 2015 models, respectively) while bicycle ownership contributes the least. Motorcycles are income generating assets while cell phones and radio are sources of information. The results also show that poverty incidences are correlated with the share of own production in the food expenditure. While the share of own production in the food consumption expenditure is found to reduce the probability of a household falling into poverty in the pooled and the year 2015 model, it was found to increase the chances of households falling into poverty in the year 2013 survey.

In Table 11, the OLS regression results of the determinants of per capita food expenditure are presented. The dependent variable is the log of the total value of food items purchased per person in the household. Before we turn to the specific determinants of per capita food expenditure, it is important to mention that while there was no significance difference in per capita expenditure on food between 2013 and 2015 survey (pooled model). However, per capita expenditures on food were higher in SA2 compared to HR1. Per capita expenditures on food were six and 11 percent higher in SA2 in the pooled model and the 2015 model, respectively.

The results show that per capita food expenditure is a function of household demographic variables such as the gender and education attainment of the household head, household composition, and idiosyncratic household shocks among other factors. Per capita expenditure on food items is higher in male headed households than in female-headed counterparts by about eight percent. Unsurprisingly, per capita, food expenditure is an increasing function of household head's

education attainment. For example, in the pooled model, per capita spending on food is about nine percent higher in households headed by persons with 4-8 years of primary education, and by almost 40 percent in households headed by individuals with post-secondary education level. Households headed by individuals with 0-2 years of schooling is the base category.

Per capita expenditures on food are higher in households dominated by members aged 11 years and below. Each additional member in this category increases household per capita spending on food by more than 10 percent. Expenditures on food decline as households' membership get dominated by aged persons. Paradoxically, the results further show that per capita food expenditure is higher in female only and male only headed households than in male or female headed households with spouses. For example, per capita, food expenditure in male only headed households is about 40 percent higher than in households headed by male/female with their spouses. As expected, the share of own production in the food consumption expenditure increases household per capita by about 18 and 47 percent in the pooled model and the 2015 models, respectively.

The results show that the proportion of family resources spent on health, funeral and school related expenses significantly reduces household per capita food expenditure. For example, if the share of health and education expenses increases by ten percent, household per capita spending on food drops by three and eight percent, respectively. These results underscore how random shocks have the capability of pushing households into poverty. Studies have shown that poor households are more prone to adverse shocks than are wealthier households.

Table 6: Average partial effects of Probit estimation of correlates of poverty

Dependent variable: Household is poor (1=yes)	Pooled cross sections		Year 2013		Year 2015	
	Marginal effects	SE	Marginal effects	SE	Marginal effects	SE
Household demographic variables						
HH head gender, 1=male	-0.014	(0.02)	-0.018	(0.02)	-0.015	(0.03)
HH head age	-0.002***	(0.00)	-0.001	(0.00)	-0.003***	(0.00)
HH head is literate, 1=yes	-0.058**	(0.03)	-0.062	(0.04)	-0.047	(0.03)
HH head has 1-3 yrs primary education, 1=yes	0.004	(0.03)	-0.046	(0.04)	0.060*	(0.04)
HH head has 4-8 yrs primary education, 1=yes	-0.014	(0.03)	-0.03	(0.04)	0.001	(0.04)
HH head has secondary education, 1=yes	-0.133***	(0.03)	-0.130***	(0.05)	-0.132***	(0.05)
HH head has post-secondary education, 1=yes	-0.320***	(0.05)	-0.334***	(0.07)	-0.300***	(0.06)
HH members <6 yrs	0.094***	(0.01)	0.115***	(0.01)	0.069***	(0.01)
HH members 6-11 yrs	0.085***	(0.01)	0.072***	(0.01)	0.099***	(0.01)
HH members 12-17 yrs	0.054***	(0.01)	0.052***	(0.01)	0.051***	(0.01)
HH members 18-24 yrs	0.024***	(0.01)	0.006	(0.01)	0.042***	(0.01)
HH members 25-50 yrs	0.032***	(0.01)	0.014	(0.01)	0.051***	(0.01)
HH members 51-65 yrs	0.039***	(0.01)	0.006	(0.02)	0.070***	(0.02)
HH members >65 yrs	0.072***	(0.02)	0.070***	(0.03)	0.076***	(0.02)
HH type dummy (1=Female adult only)	-0.065***	(0.02)	-0.090***	(0.03)	-0.034	(0.03)
HH type dummy (1=Male adult only)	-0.192***	(0.04)	-0.244***	(0.07)	-0.153***	(0.05)
Household asset ownership						
HH has mobile phone, 1=yes	-0.126***	(0.02)	-0.109***	(0.02)	-0.134***	(0.03)
HH has radio or TV, 1=yes	-0.152***	(0.01)	-0.150***	(0.02)	-0.151***	(0.02)
HH has bicycle, 1=yes	-0.049***	(0.01)	-0.032*	(0.02)	-0.063***	(0.02)
HH has motorcycle, 1=yes	-0.344***	(0.03)	-0.390***	(0.06)	-0.312***	(0.04)
Agricultural production						
Share of own production in food consumption expenditure	-0.069**	(0.03)	0.098**	(0.04)	-0.256***	(0.04)
FtF Zones of influence						
Zone of influence dummy (1=SA2)	-0.049***	(0.01)	-0.002	(0.02)	-0.083***	(0.02)
Year dummy (1=2015)	0.050***	(0.01)				
Observations	4812		2365		2447	

Note: Standard errors in parentheses; $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 7: OLS regression results of determinants of per capita food expenditure

Dependent variable: Log[per capita food expenditure]	Pooled regression		Year 2013		Year 2015	
	Coeff	SE	Coeff	SE	Coeff	SE
Demographic variables						
Gender of HH head, 1=male	0.079***	(0.02)	0.086***	(0.02)	0.069*	(0.04)
HH head age	0.001	(0.00)	0.001	(0.00)	0.001	(0.00)
HH head is literate, 1=yes	0.036	(0.03)	0.079*	(0.05)	-0.017	(0.04)
HH head has 1-3 yrs primary education, 1=yes	0.067**	(0.03)	0.133***	(0.04)	0.005	(0.05)
HH head has 4-8 yrs primary education, 1=yes	0.087**	(0.04)	0.084	(0.05)	0.095*	(0.05)
HH head has secondary education, 1=yes	0.229***	(0.04)	0.201***	(0.06)	0.250***	(0.06)
HH head has post-secondary education, 1=yes	0.390***	(0.04)	0.331***	(0.06)	0.425***	(0.06)
HH members <6 yrs	-0.130***	(0.01)	-0.148***	(0.01)	-0.102***	(0.01)
HH members 6-11 yrs	-0.119***	(0.01)	-0.120***	(0.01)	-0.119***	(0.01)
HH members 12-17 yrs	-0.094***	(0.01)	-0.087***	(0.01)	-0.099***	(0.01)
HH members 18-24 yrs	-0.048***	(0.01)	-0.032***	(0.01)	-0.067***	(0.01)
HH members 25-50 yrs	-0.040***	(0.01)	-0.044***	(0.01)	-0.036**	(0.01)
HH members 51-65 yrs	-0.019	(0.01)	-0.005	(0.02)	-0.033*	(0.02)
HH members >65 yrs	-0.067***	(0.02)	-0.072**	(0.03)	-0.072***	(0.02)
HH type dummy (1=Female adult only)	0.065***	(0.02)	0.106***	(0.03)	0.021	(0.04)
HH type dummy (1=Male adult only)	0.402***	(0.04)	0.371***	(0.06)	0.442***	(0.06)
Agric. production						
Share of own production in food consumption expenditure	0.182***	(0.03)	-0.078*	(0.05)	0.469***	(0.05)
Shocks and education						
Share of health expenses in total expenditure	-0.309***	(0.11)	-0.405**	(0.16)	-0.249	(0.15)
Share of school expenses in total expenditure	-0.823***	(0.08)	-0.830***	(0.12)	-0.758***	(0.12)
Ratio of funeral expenses to total expenditure	-0.282**	(0.13)	-0.169	(0.15)	-0.692	(0.50)
FtF Zones of influence						
Zone of influence dummy (1=SA2)	0.058***	(0.02)	-0.006	(0.02)	0.114***	(0.02)
Year (1=2015)	0.011	(0.02)				
Constant	10.220***	(0.04)	10.292***	(0.06)	10.170***	(0.07)
Observations	4812		2365		2447	
Adjusted R2	0.35		0.36		0.37	

Note: Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5 Dynamics of Poverty

Using a single dimension such as income to measure poverty has been criticized as no one indicator can capture the multiple dimensions through which poverty status is established or manifested (Alkire, 2007). In this section, we calculate the multidimensional poverty, where we explain the various deprivations such as health, education, and standards of living. This approach allows us to explain poverty from different perspectives. For example, it is a known fact that overall economic growth may not trickle down and impact household level indicators such as nutritional level of household members of their education attainment. The advantage of this method is that it allows us to see what dimension contributes largest to poverty, and allow policy makers to take adequate action to address this challenge thereby having a greater impact in addressing poverty.

To evaluate the dynamics on poverty, we construct a Multidimensional Poverty Index following Alkire and Santos (2010) and Alkire and Foster (2011). This approach has two stages. The first stage analyzes specific deprivations for a household, while the second stage determines whether a households is poor based on the number of deprivations. Sensitivity analysis and stochastic dominance tests are then conducted to establish a robust ranking of the measures. The sensitivity test assesses the extent to which the poverty estimates are sensitive to weights across dimensions and the number of deprivations to qualify as multidimensional poor. The spatial and inter-temporal dominance tests establishes a robust ranking between areas/regions and across time periods between regions. We will also try and establish the correlation between income poverty and multidimensional poverty using simultaneous structural models.

5.1. The Multidimensional Poverty Index Methodology

The Multidimensional Poverty Index (MPI) is a measure of acute global poverty. The index was developed by Alkire and Santos (2010, 2013) in collaboration with United Nations Development Programme (UNDP). This methodology, which first appeared in the *2010 Human Development Report*, is an adaptation of the adjusted headcount ratio (M_0) proposed in Alkire and Foster (2011). The method assesses the nature and intensity of poverty at the individual/household level against multiple criteria. The methodology identifies who is poor based on the intensity of deprivation that they suffer. MPI combines two aspects of poverty: the

incidence of poverty (the percent of people who are poor usually referred to as the headcount ratio (H)), and the intensity of individual's/household poverty (the average percentage of dimensions in which the poor people are deprived (A)).

Mathematically, MPI is computed as:

$$MPI = H \times A$$

5.2. The MPI Measurement design

Alkire and Foster methodology is a general framework for measuring multidimensional poverty since many key decisions are left to the user. These include the selection of dimensions, dimensional cutoffs (to determine when a person/household is deprived in a dimension), dimensional weights (to indicate the relative importance of the different deprivations), and a poverty cutoff to determine when a person has enough deprivations to be considered to be poor (Alkire and Foster 2011). This is a departure from the analysis of poverty based on single dimension such as income or expenditure. In single dimensional analysis of poverty, people are identified as poor as long as they fail to meet a threshold called 'poverty line' and non-poor otherwise. On the other hand, multidimensional analysis is based on counting approach. In this method, a household is identified as multidimensionally poor or non-poor in two steps. In the first step, a person/household is identified as deprived or not in each indicator subject to the deprivation cutoff. The methodology particularly uses ten indicators which are organized in three dimensions: education, health and living standards. The three dimensions are equally weighted in accordance with dimension and weights as the Human Development Index (HDI). The second stage is determining the whether a household is poor based on the number deprivations. The indicators in each dimension are also weighted equally. Thus, each household is identified as deprived or non-deprived in each indicator based on the deprivation cut-off (Alkire and Santos 2010). After identifying the set of poor and non-poor and their deprivation score, the next step involves obtaining the adjusted headcount ratio (M_0) commonly referred to as the Multidimensional Poverty Index (MPI).

5.3. Dimensions, indicators, cutoffs and weights

This study builds upon the global MPI design and retains three dimensions: health, education and living standards. The three dimensions are equally weighted in accordance with dimension

and weights as the Human Development Index (HDI), that is, each dimension is given one-third weight (1/3). Each dimension has a set of indicators. However, the indicator choices in each dimension is influenced by availability of data (Alkire & Robles, 2016). Although the FTF midline survey in 2015 collected anthropometric measures that inform nutrition, the data lacks information on child mortality. Equally, in 2013, baseline survey, we do not have any nutrition or health information. As a result, using available information, we are only able to compute the MPI for the 2015 wave.

Instead of the traditional 10 indictors used in the global MPI, 14 indicators are used in this study. Seven indicators are the same as the global MPI. The weights used in the analysis adopts the standard MPI structure of equal-nested weights, assigning one-third to each of the three dimensions of education, health and living standard. For example, in the education dimension, there are two indicators, so each indicator receives a 1/6 weight. For health, since the dataset lacks information on child mortality, the nutrition indictors were broken down into four indicators, namely, anemia, under-weight, stunting and wasting and each indicator allocated a weight equal to 1/12. Living standards indicators include electricity, improved sanitation, improved drinking water, cooking fuel, and dwelling, each allocated equal weighting (1/18). However, instead of using floor material only as an indicator of dwelling, we include roofing, walling and flooring and each of these is allocated 1/54 weight. Table 8 below shows the indicators used in calculation of MPI and the weight attached for each indicator.

Table 8: The dimensions, indicators, deprivation thresholds and weights of the MPI

Dimensions of poverty	Indicator	Deprived if…	Related to	Weight
Education	Years of Schooling	No household member aged 10 years or older has completed 5 years of schooling	MDG 2	1/6
	Child School attendance	Any school-aged child+ is not attending school up to the age at which he/she would complete class 8	MDG 2	1/6
Health	Anemia	Any women or child for whom there is nutritional information that they are anemic	MDG 1	1/12
	Under Weight	Any women or child for whom there is nutritional information that they are underweight	MDG 1	1/12
	Stunted	Any child for whom there is nutritional information that they are stunted	MDG 1	1/12
	Wasted	Any child for whom there is nutritional information that they are wasted	MDG 1	1/12
Living Standard	Electricity	The household has no electricity	MDG 2	1/18
	Improved Sanitation	The household has sanitation facility is not improved (according to MDG guidelines), or it is improved but shared with other households	MDG 7	1/18
	Improved Drinking Water	The household does not have access to improved drinking water (according to MDG guidelines)	MDG 7	1/18
	Flooring	The household has a dirt, sand, dung type of floor.	MDG 2	1/54
	Roofing	The household has grass, polythene sticks or unspecified roof type	MDG 2	1/54
	Walling	The household has mud, polythene wall type	MDG 2	1/54
	Cooking Fuel	The household cooks with dung, wood or charcoal	MDG 7	1/18
	Asset Ownership	The household does not own more than one radio, TV, telephone, bicycle, motorbike, or refrigerator and does not own a car, a pickup, a truck, a tractor or minibus	MDG 7	1/18

5.4. The Multidimensional Poverty Index

The MPI approach uses thresholds to decide whether a household is multidimensionally poor or not. The framework involves first developing a deprivation cutoff which is dimension-specific poverty. Under this measure, a household is considered deprived in each indicator if their achievement falls below the cutoff. In the second stage, a cross-indicator cutoff (or poverty cutoff) is developed where the minimum number of deprivations necessary across indicators is set to determine whether a household is considered MPI-poor or not. Following the global MPI approach, this analysis uses poverty cutoff at roughly one-third of the indicators.

A household is identified as multidimensionally poor (or 'MPI poor') if they are deprived in at least one third (33.3%) of the weighted indicators (Alkire & Santos, 2010). We define MPI poverty headcount as the censored headcount if a person is not achieving the threshold in at least one third of total indicators. However, this method also allows one to observe the poverty levels if the threshold is increased or reduced.

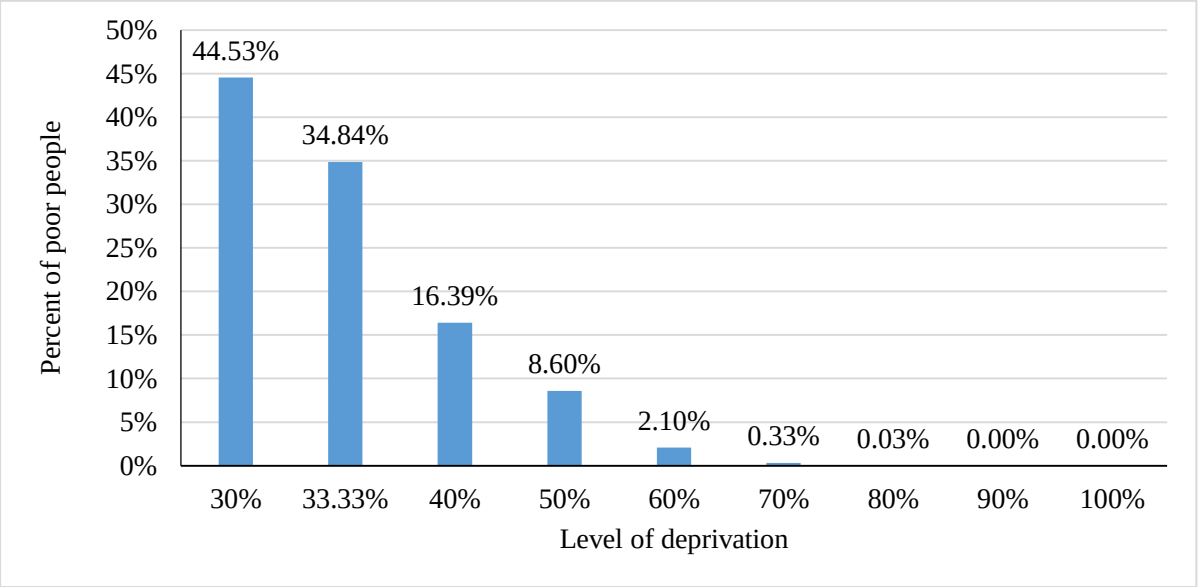
Using the one-third threshold, the study findings show that the overall MPI is 0.15 (Table 9). The MPI for HR1 is higher that that of SA2. At the 33.3% threshold, there are more MPI poor persons in HR1 and SA2. However, the intensity of poverty is higher in SA2 than in HR1. Living standard dimension has the largest contribution to MPI poverty. Our indicators capture expnditures that are likely to be used by households in the short to medium term. This suggests that targetting households incomes or programs that affect household incomes is likely to reduce MPI poverty much faster. This is supported by the distribution in Figure 9, which shows that there is a 10 percentage point reduction in MPI poverty when the threshold changes fro 30% to 33.3%.

Table 9: Overall Multidimensional Poverty Measurement using the one-third cutoff

Poverty Indicator	Overall	HR1	SA2
Multidimensional Poverty Index (MPI = H×A)	0.1516	0.1654	0.11818
% of Poor People (H)	34.84	38.72	25.45
Average Intensity Across the Poor (A)	43.51	42.71	46.45
% of Population in Severe Poverty (k ≥50%)	8.95	9.03	8.77
Education contribution (%)	12.60	12.60	12.60
Health contribution	28.32	29.64	23.94
Living standard contribution	58.47	59.91	53.39
Population Share		58.36	41.64

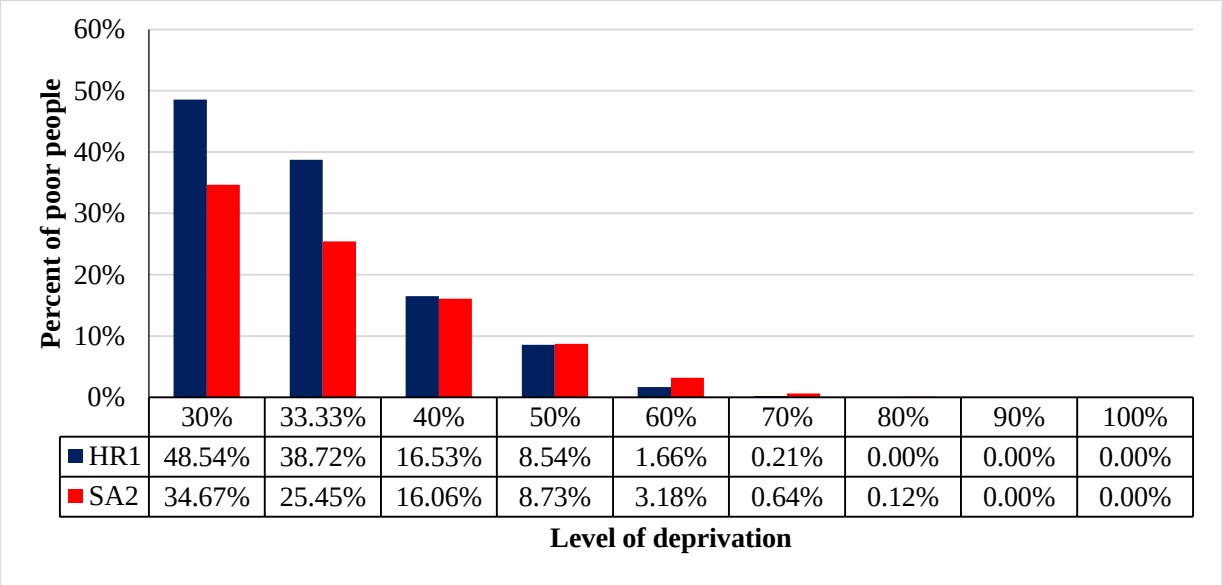
One advantage of the MPI method is its flexibility in deciding where the cutoff (poverty line) lies. Figure 9 shows the percentage of MPI-poor households against the level of deprivations. Setting the threshold to one-third (33.3%) of deprivations, the results show that 35% of househlds are considered to be MPI-poor, that is, nearly 4 in ten households in the sampled zones of influence are deprived in at least one third of the indicators. Also, nearly one household in ten (9%) is in severe poverty, being deprived in 50% or more of the indicators. If the threshold is set at 30%, implying that those deprived in more than 30% of the indicators, the overall MPI poverty level is 45%.

Figure 9: Percentage of MPI-poor households by the level of deprivations



There are differences in the distribution of poverty across the zones of influence as the threshold varies (Figure 10). In HR1, for example, the slope is much steeper. Nearly half of the households (49%) are MPI-poor at 30% threshold. This falls sharply to 39% at 33.3% deprivation level and 17% at the 40% deprivation level. By contrast, 35% are MPI-poor at 30 % threshold and falls to 25% at 33.3% threshold. In both ZOIs, the MPI poverty levels converge at 50% threshold. There are slightly more people in severe poverty (above 50% thresholds) in SA2 that in HR1.

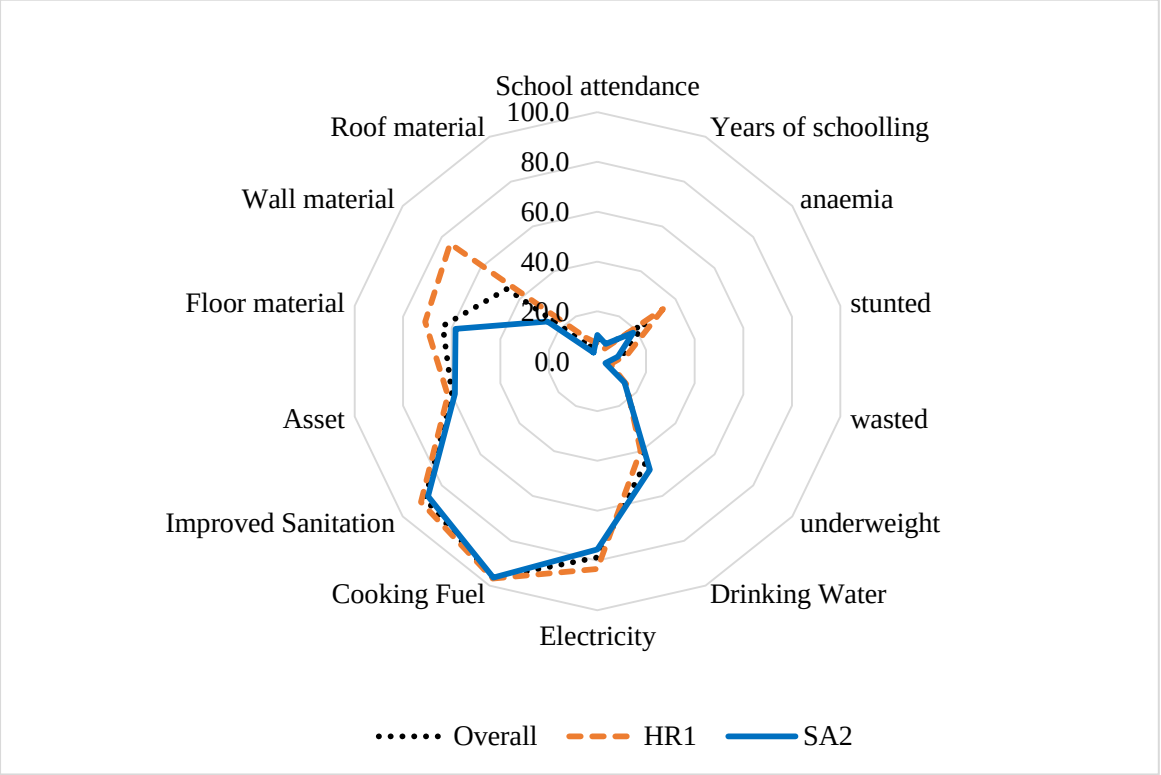
Figure 10: Percentage of MPI-poor households across zones of influence by the level of deprivations



	30%	33.33%	40%	50%	60%	70%	80%	90%	100%
HR1	48.54%	38.72%	16.53%	8.54%	1.66%	0.21%	0.00%	0.00%	0.00%
SA2	34.67%	25.45%	16.06%	8.73%	3.18%	0.64%	0.12%	0.00%	0.00%

The findings also show that household living standards dimension had the largestest contribution to MPI poverty, followed by health dimension. This is also consistent across the two zones. Across the zones of influence, households in HR1 are more deprived than those in SA2 with regard to electricity, wall material, floor material, and Anaemia indicators (Figure 11).

Figure 11: Percentage of the population who are MPI poor and deprived



6 Conclusion and implications

6.1. Summary of findings

This section discusses the main findings from the study and lessons that can be drawn about the key drivers of poverty and dynamics of poverty. These lessons help to better understand the trends and impacts of the Feed the Future program and inform the recommendations to for improvement, if any, to maximize the program's impact on the rural household poverty reduction program, to understand the trends and impact of the program so far and to recommend, if necessary, steps that can be undertaken to maximize impact of the project.

This study examined determinants, trends as well as the dynamics of poverty in rural Kenya using data collected in 2013 and 2015 from FTF zones of influence. The descriptive results characterized poor households by socio-economic indicators. The results show that the education level and literacy status of the household head plays an important role in poverty incidence. The lower the education level of the household head, the higher the poverty rate. And when the household head is illiterate, the chance of being poor is also higher.

The findings show that poverty incidence is significantly higher among female headed households. Surprisingly, by household type, the incidence of poverty is highest among male and female adult households compared to female adult only. Results of the probit model also indicate that household headed with males or females only had a higher chance of falling into poverty than households with both male and female adults.

The results further show that higher of incidence of poverty among the largest 40 percent of the households and lowest among the 20 percent smallest household suggesting that household size has significant influence on per capita consumption of the household as the result also show that about 20 percent of the largest households experienced severe hunger. The regression results also show that poverty is likely to be higher among households with higher dependency burden

Poor household do poorly in food production and rely more on the market and other sources for their food needs. While the share of own production in the food consumption expenditure is found to reduce the probability of a household falling into poverty in the pooled and the year 2015 model, it was found to increase the chances of households falling into poverty in year 2013 survey.

By asset ownership, a large proportion of poor households own cell phones (81%), a little less than the non-poor households hence access to services and information through mobile phones can reach a broader base of households. This study also found that dwelling and sanitation conditions are correlated with the poverty status of a household. The proportion of poor households that had their roofing materials done with iron sheet or tiles was lower compared to their non-poor counterparts, similarly patterns are also observed in wall, floor material, source of water and type of toilets used. The regression results also show that poverty incidences are negatively correlated household physical asset wealth.

The econometric estimation correlating household poverty and per capita food expenditure from the pooled data for the years 2013 and 2015 survey data, shows that the probability of a household falling into poverty increased in the year 2015 compared to 2013. Furthermore, the chances of household falling into poverty are lower in SA2 FTF zone of influence compared to HR1.

The results show that the overall MPI poverty rate is about 35 percent of the population in the FTF zone of influence. This rate is higher in in HR1 (38.7%) compared to SA2 (25.5%). However, the average intensity of deprivation which reflects the share of deprivation each poor person experiences was, on average higher in SA2 (46.5%) compared to HR1 (42.7%). The overall MPI index, which is a product of percent of poor people and average intensity of poverty was 0.15 implying that poor in FTF-ZOI experiences $3/20^{th}$ of the deprivation that would that would be experienced if all people in FTF-ZOI were deprived in all the indicators. The living standard dimension has the highest contribution to MPI poverty followed by health.

The findings of the MPI analysis are consistent with earlier findings from section three on determinants of poverty using standard poverty measures. For instance, asset ownership including living in improved dwelling units, especially floor and wall material, was negatively correlated to poverty. We also find substantial proportion of the population that are MPI poor and deprived in terms of asset ownership, floor and wall material. Although the MPI analysis is not done for the 2013 survey, we see a consistent trend between the two survey periods under consideration.

6.2. Implications of the findings

The findings from this study have implications on the approach to poverty alleviation by government and development partners in rural areas. Variables that change in the long term

such as education and health, had lower contribution to overall poverty status and a much lower proportion of households was deprived in this dimension. On the other hand, living standard dimension had the greatest contribution to household poverty. This dimension captures type of dwelling unit, asset ownership as well as access to water and sanitation, and energy. These key aspects are likely to be affected by shocks to the household both in the short and long run. For example, a production shock to a farming household may result in selling some disposable assets to make up for shortfall in income while maintaining the same standard of living, especially if no non-farm income sources exist. However, if the shock is sustained or experienced over the long term, a household may be forced to radically change standards of living to survive.

As such, programs that target increasing incomes for rural households as well as coping mechanisms to shocks, either production shocks or macroeconomic shocks, are likely to have a higher impact in alleviating poverty.

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Annexes

Annex 1. Calculation of standard poverty

This section has been adopted from the Feed the Future Kenya 2015 Zone of Influence Interim Assessment Report by Tegemeo Institute, Nairobi. The section explains the methodology used in the calculation of standard poverty measures i.e. the poverty headcount and poverty gap. The poverty line is standard at 1.25 US dollars per day.

We follow the expenditure approach in calculating the poverty levels for the households. A household is considered poor if their per capita household expenditure is below $1.25 per day. For comparison with other countries, we calculate the poverty line in local currency unit as follows:

1. We convert the daily per capita expenditure to USD equivalent as follows:
   a. Calculate the conversion factor for Kenya shilling to USD by dividing the 2005 consumer price index in Kenya shillings by 2014/2015 consumer price index in Kenya shillings using 2010 as the base year

$$\frac{\text{2005 CPI KES}_{2010}}{\text{Average(April 2014 to March 2015) CPI}_{2010}} = \frac{55.53}{142.9116} = 0.3885$$

   b. Calculate the conversion factor to 2005 USD PPP by dividing one dollar by the 2005 purchasing power parity

$$\frac{1}{USD\ PPP_{2005}} = \frac{1}{32.68} = 0.030599755$$

   c. Calculate the conversion factor of USD 2014/15 prices to USD 2005 prices by dividing the 2014/15 USD CPI by 2005 USD CPI

$$\frac{USD\ CPI_{2014/15}}{USD\ CPI_{2005}} = \frac{108.55}{89.5605} = 1.212$$

   d. Calculate the final conversion factor by multiplying a, b & c to get 0.0144
2. Calculate the poverty line in Kenya shillings as

$$(\$1.25 * PPP\ exchange\ rate_{2005}) * \left(\frac{CPI_{2014/15}}{CPI_{2005}}\right) = (1.25 * 32.68) * \left(\frac{142.9116}{55.53}\right)$$

$$= 105.14$$

Following this calculation, the poverty line in Kenya shillings changed from Ksh.91.75 in 2013 to Ksh.107.9 in 2015 representing a 14.6 % increase.

Standard Poverty Indicators

Headcount Ratio

The poverty headcount ratio is measured by determining the percent of individuals living below a poverty threshold.[7] A standardised poverty line of $1.25 per person per day in adjusted[8] 2005 USD is used to track global changes in poverty across countries and over time.

Poverty Gap

The poverty gap is a useful poverty estimate because it captures the extremity of poverty. This measure indicates the average gap between consumption levels and the poverty line, with the non-poor counted as having a gap of zero. The measure is expressed as a proportion of the poverty line.

[7] Note that expenditure data are not collected at the individual level but rather at the level of the household; individuals' per capita expenditures are then derived by dividing total household expenditures by the number of household members.

[8] Adjustments are made according to PPP conversions. These conversions are established by the World Bank to allow currencies to be compared across countries in terms of how much an individual can buy in a specific country. The $1.25 in 2005 PPP means that $1.25 could buy the same amount of goods in another country as $1.25 could in the United States in 2005.