SOCIO-ECONOMIC FACTORS INFLUENCING SMALLHOLDER FARMER HOUSEHOLD FOOD SECURITY IN BOMET COUNTY, KENYA

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Abstract: **Majority of farmers live in rural areas and contribute immensely to economy and wealth creation among the rural population, however they are faced with myriad of problems including food insecurity. Even though they participate in food production most of them are food insecure. The objectives of the study included to: (1) examine the socio-economic profile of smallholder farmers, (2) determine the socio-economic factors influencing food security among smallholder farmers and (3) assess household food security status of smallholder farmers. The study utilized both primary and secondary data sources. Purposive sampling was used to select 384 respondents who were interviewed using structured questionnaires. To establish food security status of farming households in the study area, Food Insecurity Experience Scale (FIES) which is a food security measurement scale was used to determine food security status of each household. Logit regression model was used to analyze the influence of socio-economic factors on farm household food security. Data was summarized and presented through descriptive statistics using SPSS version 20.0 software. Results showed that only 20.7% of the respondents were food secured compared 79.3% who were food insecure. Additionally, seven variables positively influenced food security of the household: age, land size, gender, educational level, civil status, household incomes, price of major agricultural commodities and access to credit. Apart from gender and price of major agricultural commodities other variables positively and significantly influenced food security. Based on research findings the main recommendations of the study include: family planning would be necessary to reduce high food insecurity; Efficient land use, soil conservation and modern farming technologies be adopted to improve food security; and policies that encourage youth participation in agriculture should be developed and adopted.**

Keywords: **Bomet County, food security, logit regression, socio-economic.**

1. INTRODUCTION

The fundamental challenge currently facing the world today is ensuring millions of households specifically those living in abject poverty to have access to enough food to maintain a healthy life. However food insecurity problem has been persistent for a longer period especially in developing nations. Since the First World Food Summit held in Rome in 1996 where 182 governments vowed to eradicate hunger in all countries through various agreements including millennium Development Goals and Sustainable Development Goals (SDGs). Although there have been slight improvement in some countries, most developing countries are ravaged by hunger and malnutrition. In 2000 when Millennium Development Goals (MDGs) were developed, one of their target was to reduce people reducing the proportion of people living in extreme poverty and hunger by half however FAO (2015) report showed that a good progress was made but goal was

missed by small margin despite challenging global environment. In 2015, an estimated 825 million people still lived in extreme poverty and 800 million still suffered from hunger. Eliminating poverty and hunger remains as the fundamental issue again in Sustainable Development Goals (SDG) (United Nations, 2015). The statistics further pointed out that majority of the people who were faced with food insecurity were in developing countries with Southern Asia and Sub Saharan Africa having 281million and 220 million respectively. In East Africa 124 million people suffered from malnutrition. In Kenya, the food security condition has not been better either as a result of diminishing land productivity, erratic weather patterns, pests and diseases. More than 51 percent of the population in Kenya lacked adequate food (FAO, 2013). The report further indicated that in Kenya over 10 million people suffer from hunger of which 3.8 million individuals required food assistance in 2010 however the figures marginally reduced to 3.75 million people by the end of 2013.

World Food Summit 1996, defined food security as a situation where food security exist when all people at all times have economic and physical access to sufficient, safe and nutritious food to meet their dietary needs and preference for an active and healthy life. Jrad *et al.*, (2010) further expounded on five dimensions of food security as food availability, food accessibility, food utilization, stability of food supply and food and nutrition safety. This study will be limited to four dimensions of food security: availability, accessibility, utilization and stability.

 Food Insecurity Experience Scale (FIES) measure of food security was utilized for this study where eight item questions was asked to reveal actual experience by a given individual or members of a given household (Ballard et al., 2013). This measure is recommended as a monitoring indicator for food security for the post 2015 Sustainable Development Goals (SDG) agenda.

Objectives of the Study:

The specific objectives of the study included:

i.   To examine socio-economic profile of smallholder farmers in the study area

ii.   To determine socio-economic factors influencing food security among smallholder farmers in Bomet County

iii. To assess household food security status of smallholder farmers in the Bomet County

Research Questions:

i.   What are the socio-economic profiles of smallholder farmers?

ii.   What are the socio-economic factors influencing food security among smallholder farmers in Bomet County?

iii. What are food security statuses of smallholder farmer households?

Ethical Considerations:

The researcher obtained an introduction letter from the University of Kabianga which enabled the researcher to acquire a permit from the National Commission for Science, Technology and Innovation (NACOSTI) to conduct this research.

2. METHODOLOGY

Study area:

Bomet County is one of the 47 Counties in Kenya covering of 2037.4 Km^2. It is located at south west of Rift Valley and Bomet County lies between latitudes 0º 29' and 1º 03' south and between longitudes 35º 05'and 35º 35' east. Current estimated population according to KNBS 2009 is 891,168. It has five sub-counties (Constituencies) namely Konoin, Bomet Central, Bomet East, Sotik and Chepalungu. Each Sub-County has five wards making total of 25 wards. Bomet County is situated in two main agro-ecological zones: lowland highlands (LH) and upper midlands (UM) with average annual rainfall ranging from 1000 mm to 1384 mm. Temperature levels ranges between 16º C to 24º, (CGoB, 2013 and KNBS, 2015). Dairy farming, tea growing and maize farming are the main agricultural activities in this area. Main soil types in upper part are red volcanic soil suitable for tea farming and lower part is composed of loam and clay soil.

Research Design:

Descriptive research design was used to conduct this research. Both qualitative and quantitative approaches were used in data collection and analysis. Secondary data was also collected from the existing literature while primary data were collected through face to face structured questionnaires administered to the respondents.

Target Population:

The study targeted 384 farmers out of the total 108,119 farmer households in 3 sub counties: Bomet Central, Konoin and Chepalungu.

Sampling design and procedure:

A total of 384 farmers were sampled according to Kothari (2004) formula:

$n = z^2 pq_{N/(e}{}^2 (N\text{-}1) + z^2 pq)$

Where N is the size of the population, n is sample size, e *is* acceptable error (the precision), p is standard deviation of population and z is the standard variate at a given confidence level. Assuming 5% significance level, the margin of error (e) = 0.05, Z=1.96 p=0.5 N=108119, therefore sample size (n) is:

n= 1.96^2x0.5x.05x108119/ (0.05(108119-1) + 1.96^2x0.5x0.5)

=384

Data Collection Instruments:

The study sampled 384 smallholder farmers who were administered with structured questionnaires to obtain primary data for analysis. Secondary data was also obtained from Ministry of Agriculture, microfinance offices, Saccos, journals and ward multipurpose cooperative societies offices among others.

Validity and reliability of data collection instruments:

Pilot study and pre-testing of data collection instruments was conducted in Bomet East for validity and reliability. Farmers in Bomet East Sub County who were not in the sample but with similar characteristics were administered with questionnaire then after one week, another set of questionnaires containing the same items as the previous set of questionnaires were administered to the same farmers. Pearson's Product-Moment Correlation Coefficient (PPMCC) of 0.3052 was obtained which is statistically significant to be relied upon as it is greater than zero.

Data Analysis:

Both quantitative and qualitative approaches were used for data analysis. Quantitative data from the questionnaire were coded and entered into the computer for computation of descriptive statistics. Data was summarized and presented using descriptive statistics such as percentages, histograms, pie charts, bar charts, means and standard deviation. The Statistical Package for Social Sciences (SPSS version 20.0) was used to run descriptive statistics to present the quantitative data in form of tables based on the major research questions.

Binary logistic regression model commonly referred to as logit model was used for inferential analysis of the study. The Household Food Insecurity Experience Scale (FIES) was utilized which disaggregated the households into food secure which took value of one and zero if otherwise. To establish relationships between socio-economic variables and use of credit facility on food security, logit regression model was employed where cumulative logistic probability is econometrically stated as follows:

$P_i = F(Z_i) = 1$

$1 + e^- (\alpha + \Sigma\beta_i X_i)$ ……………………………………………………………………………………………….. (1)

Where:

P_i = the probability that an individual will be food secure given X_i as measure by Food Insecurity Experience Scale using eight item response question

X_i = a vector of explanatory variables

α & β = regression parameters that were estimated.

e = the base of the natural logarithm

For ease of interpretation of the coefficients, a logistic model was written in odds ratio and log of odds. The odds ratio that household is food secure, (P_i) to the ratio of a household not being food secure ($1- P_i$), therefore given as follows:

$$1-P_i=ez_i \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2)$$

Taking the natural logarithm of the equation yields:

$$\text{Ln } (P_i/1-P_i) = Z_i =\alpha+\beta_1 X_1+\beta_2 X_2 +\dots+\beta_m X_m \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (3)$$

If the error term, i considered than equation becomes:

$$Z_i= \alpha+\Sigma \beta i \, m \, i=0 \, Xi + ei \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (4)$$

3. RESULTS AND DISCUSSION

Socio-economic profile of smallholder farmers:

One of the specific objectives of the study was to examine the socio-economic profile of smallholder farmers in the area of study. Respondents who answered questionnaire were 304 out of 384. The study showed that 51.6% of the respondents were male while 48.4% were female. On educational level perspective, it was noted that illiteracy level was high in the study area with 36% being illiterate whereas 33% and 31% had primary and high school or beyond respectively. Civil status showed that 54.6% of respondents were married and 28.6% single and the rest were either widowed or divorced. Concerning the household heads, male headed households dominated with 54.3% and 45.7% were female headed households. Similarly, majority respondents were youth consisting 71% and 18% were middle aged while 11% were above 60 years or elderly as shown by table 1 below. Land ownership also showed majority of the farmers had less than five hectares with only 22.2% owning above five hectares. This is summarized in the table below:

Table 1: Socio-economic profile of smallholder farmers

Socio-economic profile	Frequency(N=304)	Percentage
Gender		
Male	157	51.6%
Female	147	48.6%
Educational level		
Illiterate	109	36%
Primary	100	33%
High School and above	95	31%
Civil Status		
Single	87	28.6%
Married	169	54.9%
Divorced	5	1.7%
Widowed	45	14.8%
Household head		
Male headed	165	54.3%
Female headed	139	45.7%
Age distribution		
< 36 years	216	71%
36-60 years	55	18%
60 years and above	33	11%
Land Size		
<1 acre	99	32.6%
1-5 acres	139	45.7%
5-10acres	51	16.7%
>10 acres	15	5%

Socio-economic factors affecting food security:

Household Income:

Household income showed a positive and significant effect on food security status of the households. Data analyzed showed that, Ceteris paribus a unit increase in income will result in a positive increase of household being food secured by 0.2% at 5% level of significance as indicated by P value of 0.212 in table 2 below. Cheruiyot (2016), Jalil (2015) and Kowurnu *et al.* (2013) also in similar studies revealed that there is significant and positive relationship between household income and food security.

Access to Credit:

The variable was found to have a significant positive relationship with food security as per the priori expectation. Access to credit in addition to increasing use of modern technology, improving food production it also serve as a production smoothening mechanism(Kowurnu *et al.* 2013). The study revealed that those who accessed credit will have probability of household being food secure increased by 4.65% at 5% significance level as indicated by the marginal effect in table 2 below. However study by Djangmah (2016) posited that access to credit had positive effect on household food security though not significant. The study highlighted importance of access to credit as an essential factor in consumption and in expansion of production through acquisition of improved inputs and modern technologies. P value of 0.120 indicated in table 2 below indicates that access to credit significantly influence food security.

Household Size:

As per the priori expectation, the larger the household size the higher the food insecurity in the household. This is as a result of higher dependency ratio. More family member's means higher number of family households to feed. Marginal effect of -0.1513 in table 2 below means that one additional member in the household reduce the probability of household being food secure by 15.13% This in line with the study conducted by Jalil (2015) and Astemir (2014) . Both studies concluded that household size increase food insecurity due to greater number of family members who share existing food production and yield. Hence this study concluded that there is significant inverse relationship between household size and food security as indicated by p of 0.111 and marginal effects of -0.1513 in table 2 below.

Price of major agricultural commodities:

Price of major agricultural commodities was found to be positive but insignificant as shown by P value of less than 0.05 at 5% level of significance as shown by table 2 below. The higher the price of major agricultural commodities the greater the likelihood of household being food secured.

Land Size:

 Land size is the total land in hectares cultivated for food and cash crops. It was established from this research that there is a significant positive relationship of 1.02% between size of land cultivated with food security given that p value for land size and food security is 0.869. This is in agreement with research conducted by Astemir (2014) which concluded that there is a strong positive correlation between land size and food security. From the findings as farm land size increased, food security increase too. However in this research there are some households with less than average farm size but produce more food than others through efficient farming and improved soil conservation.

Table 2: Socio-economic factors affecting food security

Variables	Marginal Effect	Standard error	P value
Age of household head	-0.0524	0.0306	0.102
Land size	0.0102	0.0489	0.869
Gender	-0.1512	0.1218	0.1112
Household size	-0.1513	0.0624	0.104
Educational level	0.1042**	0.0746	0.182
Household income	0.002**	0.0004	0. 120
Access to credit	0.0465**	0.1428	0.20
Price of major agricultural commodities	0.0123**	0.0087	0.003
Civil Status	0.0002	0.0003	0.134

Number of observations= 304

Wald Chi^2=24.22

Probability> Chi^2=0.0016

Pseudo R$_2$=0.5430

Log likelihood=-36.0126

Food Security status of households

In this study only 63 respondents out of 304 answered no to all the questions compared to 241 who answered affirmatively Food Insecurity Experience Scale (FIES) eight item question. These results in figure 1 below showed that only 20.7% of the respondents were food secured compared 79.3% who were food insecure. Hence, food insecurity in the area is high
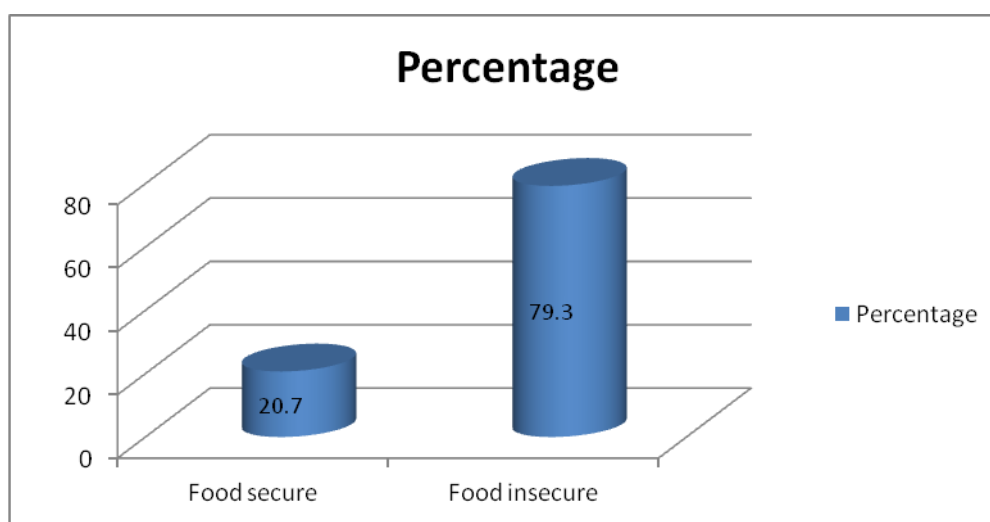

Figure 1: Food Security status of the households

4. CONCLUSION AND RECOMMENDATIONS

From this study it is concluded that majority of respondents are male, below 35 years and married. It was also noted that household land size is less than five acres .The study also examined socio-economic factors influencing food security of smallholder households in the area of study and found that seven variables positively influenced food security of the household: age, land size, gender, educational level, civil status, household incomes, price of major agricultural commodities and access to credit. Other variables apart from gender and price of major agricultural commodities positively and significantly influenced food security status of the households. Noted in this study also is food insecurity in the area with only 20% of respondents being food secure.

Population pressure has continued to diminish land holding size per household. Policies that mitigate this problem like resettlement in sparsely populated areas, soil conservation, improving production in less productive areas through adoption of efficient and modern technologies. These modern food production technologies to improve production include use of fertilizer, irrigation and certified seeds to be encouraged. Irrigation will be required to unlock less productive areas especially Chepalungu Sub County that is characterized by less and erratic rainfall. Subsidies and timely supply of fertilizer to farmers will also play a crucial role in food production. All these policies on land will aims at improving efficiency and overall agricultural production which will ensure food security.

It is recommended based on research findings that family planning is necessary to reduce high prevalence of food insecurity. As revealed from this study youth contributes a large proportion of the population hence policies that encourage their participation in agriculture should be developed and adopted. Lastly, government and non -state actors jointly fund programs that will ensure food security.

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Suggestion for Further Research:

Measurement of food insecurity for this study was conducted using experience scale measure FIES only but there is no globally accepted food security measure as there are other measurements which also need to be further researched on. There is need to also do further research on the subject matter at the national and global level. This study was limited to household and individual level.

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REFERENCES

[1] Astemir, H. (2014). Determinants of food security in rural farm households in Ethiopia. International Institute of Social Studies, The Hague, Netherlands.

[2] Ballard, T.J., Kepple, A.W. & Cafiero, C. (2013). The food insecurity experience scale: development of a global standard for monitoring hunger world-wide. Technical Paper. Rome,FAO.DOI 10.4455/eu.2014.007

[3] CGoB, (2013). County Government of Bomet First County Integrated Development Plan 2013-2018

[4] Cheruiyot, P. (2016). Intra-household Decision Making and Implication on Food Security among Smallholder Farmers in Chepalungu Constituency, Bomet County, Kenya (Master's Thesis, Egerton University, Kenya).

[5] Djangmah, G. (2016). Comparative Analysis of Food Security Status of Farming Households in Eastern and Northern Regions of Ghana. Thesis Submitted to Department of Agricultural Economics, McGill University, Montreal, Québec, Canada.

[6] FAO. (2013).The State of Food Insecurity in the World: Economic Growth is necessary but not sufficient to Accelerate Reduction of Hunger and Malnutrition. Rome, Italy.

[7] Jalil, M. A., (2015). Determinants of Access to Credit and Its Impact on Household Food Security in Karaga District of the Northern Region of Ghana. A thesis presented to Kwame Nkuruma University of Science and Technology.

[8] Jrad, S., Nahas, B., and Baghasa, H. (2010). Food Security Models. Ministry of Agriculture and Agrarian Reform, National Agricultural Policy Center. Policy Brief No 33. PP.32. Syrian Arabic Republic.

[9] KNBS (2009). Counting our People for the Implementation of Vision 2030. Kenya Population and Housing Census; Nairobi, Kenya.

[10] KNBS (2015): Bomet County Statistical Abstract. Nairobi, Kenya

[11] Kothari, C. (2004). Research Methodology: Methods and Techniques, 2nd edition. New age International Publishers (P) Ltd.,New Delhi, India.

[12] Kowurnu, J.K., Suleyman, D.M., and Amegashie, D.P. (2013). Analysis of food security status of farming households in the Forest Belt of the Central Region of Ghana. *Russian Journal of Agriculture and Socio-Economic Sciences 1(13)*. University of Ghana, Legon- Accra, Ghana.

[13] United Nations, (2015). The Millennium Development Goals Report 2015. New York Volatility in Ghana: Implications for Food Security. *European Journal of Business and Management 3 (4.): 100-118.*