ISSN 2310-4090

International Journal of Scientific Footprints

Open Access

Determinants of Food Security Status of Female-headed Households: The case of Wolaita Sodo town, South Nations, Nationalities and Peoples Region, Ethiopia

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Keywords:
Binary logit model; Female-headed households; Food security; Urban.

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Funding Information:
No funding information provided.

Received:
March 2015; Accepted: April 2015

International Journal of Scientific Footprints 2015; 3(1): 24 - 40

Abstract

Urban areas are suffering from the problem of ever increasing population and consequently inadequate food supply. This study attempts to identify determinants of food security in Wolaita Sodo town at female-headed household level. Household calorie acquisition was analyzed to measure the status of household food security. Based on the survey result of 80 female-headed households, the logistic model was estimated. Results indicate that variables related to age of household head, educational level of household head, size of the family (AE), possessing asset, number of active labor force available in the household, health status of the household head, and practicing urban agriculture were found to be statistically significant predictors of household food security in the study area. It was recommended that development interventions like effective family planning strategies and capacity building for older female household heads will immensely contribute to the attainment of food security. In general, the results of the study produce the implication that attaining food security in the urban areas of Ethiopia requires adoption of mixed strategies and policies.

Introduction

Improving the living standards of the poor is the major challenge of developing nations like Ethiopia. Sustaining needs increase in poverty reduction which is the only solution for the problem. Measures like assuring food security (both in terms of quantity and quality) at individual basis would highly help alleviate the problem globally as well as at the national level.

Food security has become a major concern of academicians, political leaders, researchers and many other professionals of the world in general and of Ethiopia in particular. The world is home to over one billion under nourished people, over 98 % of whom live in

the developing world (FAO, 2008). The population of the developing world is becoming more urban, with the urban population projected to double from 1.7 billion in 1995 to 3.4 billion in 2020 (Maxwell, 2000).

These countries are not capable enough to provide sufficient food for their expanding urban population. This leads to increased food insecurity and prevalence of poverty in the urban areas. As in many developing countries, food security assessments in Ethiopia have traditionally focused on rural areas, where the majority of the total population as well as the poorest and most food insecure segments of the population lives (Webb & Yisehac, 1992).

Factors that affect household food security, especially in rural Ethiopia, have been documented in some literature (e.g. Zerihun & Getachew, 2012; Fekadu, 2010; Mesay, 2008) and these factors are most often than not location-specific (i.e. different study areas were found to have variant attributes as food security determinants with some attributes recurring). Majority of the research works that have been done so far on the issues related to determinants of food security in Ethiopia are very general and consider the problem from the rural agrarian households' points of view. Despite the increasing national concern of improving food security and alleviate urban poverty, the issue of food security status at the household level in urban areas is not well documented. The few studies that exist have dealt with identifying determinants of food insecurity among urban households in general (e.g. Mekonnen, 2000; Aschalew, 2006; Girma, 2012).These studies, however, did not look the underlying causes of food insecurity of households at the urban in accordance with female headed households. Various studies (e.g. Omonona & Agoi, 2007) observed that the food insecurity incidence is higher in female headed households. Official statistics also reveal that they are more vulnerable and at risk due to their lower socio-economic status (WFP, 2009). This study, therefore, intends to identify determinants of food security status by gender in female-headed households of Wolaita Sodo town, southern Ethiopia.

Such rational makes this study vital because it provides with information that will enable effective measures to be undertaken so as to improve food security status and bring the success of food insecurity intervention programs. The different influencing factors which put impact on food security in urban populations, particularly among the urban poor should be considered when designing policies and programmes to improve food security status. It will also enable

development practitioners and policy makers to have better knowledge as to where and how to intervene in urban areas to bring food security or minimize the severity of food insecurity. Area and gender specific identification of determinants of the food insecurity will ease the implementation of different development projects in the urban areas.

Materials and Methods

Description of the Study Area

The study was conducted in Wolaita Sodo town, Southern Nation Nationalities People Regional State, Ethiopia. Wolaita Sodo is located about 390 km south of Addis Ababa. The town Sodo is located at latitude of 8°50°N and longitude of 37°45°E. Topographically, the area is marked by hilly, flat, steep slopes and gorges and a number of streams and mountains. The highest mountain is Damota, 2500 meter above sea level, which is located near Sodo town (WZFSD, 2013). The altitude varies from 1100-2950 m.a.s.l. The area experiences mean annual temperature of about 20°C. The mean maximum temperature is 26.2°C and the average monthly minimum temperature is 11.4°C. The rainfall regimes over much of the area are typically bimodal with the big rainy season extending from June to September and a small rainy season occurring from February to April. The mean annual rain fall of the area ranges from 450-1446 mm with the lowest being in low land and highest in high land.

Sampling Techniques

In this study, multi-stage sampling procedures were employed to select sample households. In the first stage, out of the 3 sub-cities (Arada, Merkato and Mehal Ketema) in the town, three kebeles (Damota, Kera and Wadu) were selected purposively to capture different directions existing in the town which may represent geographical and administrative structures of the town. This was followed by stratified proportionate sampling of the respondents from the sampling frame (list of female headed households) compiled by the Health Extension Agents of each kebele.

The proportionate sampling formula, by imitating a sample size of similar studies (e.g. Henri-Ukoha et al., 2013) to determine the required sample size, was applied as stated as follows:

Nh = Nn (n/N), where, Nh = sample to be selected from each stratum (kebele); Nn = population of female-headed households in each stratum (kebele); n = required sample size for the study, and N = total population of female-headed households in all the strata (three kebeles).

The target population was 810 female-headed households which is the sum of total subjects in the three selected kebeles comprised from the sampling frame of 316 in Damote, 251 in Kera, and 243 female-headed households in Wadu kebele respectively. Out of which 31 (9.9%), 25 (9.9 %) and 24 (9.9%) female-headed households were selected respectively so as to make up a sample size of 80 female-headed households. This was computed by using systematic sampling method with the sampling interval of 10 and by random selection of the 10th household beginning from the first subject in the list.

Types and Methods of Data Collection

Both primary and secondary data, which are qualitative and quantitative in nature, were applied so as to triangulate data from various sources and describe the food security status and its determinants among the sampled subjects in the study area. Primary data were collected from sample female-headed households using structured interview schedules. . Prior to actual survey, pilot test on non-sample respondents was conducted under supervision of the researcher and necessary modifications were made on the interview schedule on the basis of the responses obtained from them. First, nutrients available for the consumption of household members over the past seven days were collected. Exact recall of the food items served for the house within that week was, fortunately, easier for the females as household heads to recall the food items consumption of households per week as they are more responsible for household food preparation than the males do. The food items consumed by a household were categorized under seven food groups, adjusted for food processing to obtain the net weekly calorie availability. These food groups, according to Belay, Degye and Mengistu (2013), are (1) cereal, roots and tubers, (2) pulses and legumes, (3) dairy products (4) meats, fish and eggs (5) oils and fats, (6) fruits, and (7) vegetables. Next, data about socioeconomic, demographic, institutional and natural factors related with household food security status were collected through the interview schedule. Secondary data were obtained from different relevant secondary sources like Ethiopian Central Statistical Authority and reports of line ministries. Besides, focus group discussions, field observations and key informant interviews were conducted to supplement the research findings with qualitative information. The data were collected in the month ranging from June to July, 2014. The data were collected by trained enumerators under the close supervision of the researchers.

Methods of Data Analysis

The data analysis process involved two steps: measuring the food security status and identifying determinants of food security status of urban female-headed households in the study area.

(i) Measuring Food Security Status

In assessing food security status at the household level, a food security index was constructed. The data analysis started with the conversion of the weekly consumption data into kilocalorie. Household calorie availability was computed from each food item consumed. The quantities were converted into grams and the calorie content estimated by using the nutrient composition table of commonly eaten food in Ethiopia (Larences & King, 2004). The net weekly calorie availability was divided by seven to obtain the household daily calorie intake. The family size of each household was converted into adult equivalent (AE) which considers age and sex of each family member in the household. The daily net calorie consumption of the household was divided by the adult equivalent family size to obtain the daily calorie availability per adult equivalent of the household. . According to Hoddinott, (2002);

$$Zi = \frac{Yi}{R} \qquad (1)$$

Where, $Zi =$ Food security status of i^{th} household; $Yi =$ Daily per capita calorie intake of i^{th} household; and R= the recommended per capita daily calorie intake (2100 kcal), $Zi = 1$ for $Yi \geq R$, $Zi = 0$ for $Yi < 0$.

Households with daily calorie consumption greater than or equal to 2100 kcal per day were categorized as 'food secure', whereas those households whose calorie intake fallen below this food security threshold were grouped as 'food insecure'.

Additionally, the food insecurity gap[1], the severity index[2], the surplus index[3] and head count ratio[4] of food security were constructed because it was assumed that these estimations would give in-depth insight for the policymaking which considers the inequality among those households who are food insecure.

- Food insecurity Gap index (P) = $\frac{1}{M}\sum_{i=n}^{m} Gi$

[1] The food insecurity gap (or depth of insecurity) measures the extent to which female-headed households are food insecure.

[2] The food severity index (or squared insecurity gap) takes into account not only the distance separating the food insecure; from the poverty line, but also the inequality among the insecure, that is, a higher weight is placed on those households further away from the poverty line.

[3] The surplus index measures the extent by which food secure households exceeded the food poverty line.

[4] The head count ratio (or incidence of insecurity) measures the proportion of the female headed households that are food insecure/secure from the total population.

- where $Gi = \frac{R-Y}{R}$ (2)
- Food severity index (L) = $\frac{1}{M}\sum_{i=1}^{p} P^2$ (3)
- Food surplus gap index (S) = $\frac{1}{T}\sum_{i=1}^{m} Gi$ where $Gi = \frac{R-Y}{R}$ (4)
- Head count index (Hfi) = $\frac{M}{N}$ (5)
- Head count index (Hfs) = $\frac{S}{N}$ (6)

Where M = number of food insecure households; N = total number of households in the sample; T = number of food secure households; G_i = daily per capita calorie deficiency or surplus for i^{th} household; Hfs = headcount index for food secured households; Hfi = headcount index for food insecure households; Y_i = daily per capita calorie consumption on food item of i^{th} households; R= recommended daily per capita calorie requirement.

(ii) Specification of Logistic Model

As the dependent variable has a dichotomous nature (food secure or insecure households), a binary logistic regression was used where the estimated probabilities lie between logical limit 0 and 1 (GUJARATI, 1995). Food security as a dependent variable, thus, assumes the value of $\gamma = 1$ if a household is food secure, 0 otherwise. Following GUJARATI (1995), the functional form of logistic regression model was specified as follows:

$$L_i = L_n [P_i/(1 - P_i)] = \alpha_0 + \alpha_1.X_1 + \alpha_2.X_2 + \ldots + \alpha_0.X_i + \varepsilon_i \quad (7)$$

Where L_i = logit means log of the odds ratio, which is not only linear in X_i but also linear in the parameters. It shows how log odd in favor of food security change as the respective independent variable change by a unit

X_i = the individual i i = 1, 2, …., 14; are independent variables

P_i = the probability that an individual is being food secure, and

(1-P_i) = the probability that a household will not be food secure households:

α_0= intercept or constant term, that implies the combined impact of these fixed factors on household food security

ε_i = error term.

Descriptions of Variables Used in Binary Logistic Regression Model and their Hypothesis

The dependent variable in this study was the level of food security of a female-headed household. Therefore, the dichotomous dependent variable for binary logit was hypothesized to have the value 1 for a household who is food secure whereas it takes the value 0 for a household who is not food

secure. Definitions and measurement of the independent variables and their working hypothesis are described in Table 1.

Table 1: Definition and Units of Measurement of Explanatory Variables Used in MLM

Variables Code	Description and measurement	Expected sign
AGE	Age of household head (year)	+
EDUCLVL	Formal education of household head (grades or number of years in school).	+
FAMSIZE	Family size of household in Adult Equivalent (AE)	-
DEPRATIO	Division of inactive labor force to active labor force in the family	-
EMPLOY	It is a dummy variable that takes value 1 if the household head is formally employed and 0 otherwise	+
LIVOWN	Total livestock owned by the farm household (TLU).	+
URBNAGR	It is a dummy variable that takes value 1 if the household head is engaged in urban agriculture and 0 otherwise	+
ASSTPOSS	It is a dummy variable that takes value 1 if the household head possesses consumer durable and productive assets like small machinery and 0 otherwise	+
HHINCOM	Total sum of monthly income from the household members.	+
SAVACC	Whether the household head has saving account, it takes 1 if she possesses it and 0 otherwise.	+
CREDRCVD	Whether the household head receives credit, it takes 1 if she receives it and 0 otherwise.	+
REMITT	Whether the household head has received remittance and gift, it takes 1 if she has received remittance and gift and 0 otherwise.	+
ACTLAFC	Number of active labor force in the household.	+
HSOHH	It is a continuous variable measured by the number of days per year that the household head has been sick (out of work).	-

Results and Discussion

3.1. Household Distribution

3.1.1. Socio-economic Characteristics of the Households

Table 2 presents the distribution of female-headed households by selected socio-economic characteristics. The largest numbers (35%) of the female household heads were between ages ranging from 35 to 54 years with only a few above 55 years of age. This implies that majority of the respondents were in their active working age range. This could lead to better opportunity to be engaged in

income generating activities with the fact that younger people are energetic and have access and capacity to urban employment. Considerable numbers (30%) of household heads were illiterate with no formal of education or the other while only 11.3% were diploma holders and above. This indicates that majority of the female household heads have no academic qualifications which enable them to find modest urban jobs. Further, more than half (57.5%), were widowed and had an average household size of 4 to 5 members.

Table 2: Distribution of Households by Socio-Economic Characteristic

Variables	Categories	Frequency	Percentage
Age of household head	15-24	9	11.3
	25-34	14	17.5
	35-44	28	35.0
	45-54	19	23.8
	55 and above	10	12.5
Family size (AE)	0.75-1.75	23	28.8
	1.76-2.25	6	7.5
	2.26-3. 75	22	27.5
	3.76-4.25	11	13.8
	4.26-5.75	16	20.0
	5.76 and above	2	2.5
Educational level	illiterate	24	30.0
	1-4	15	18.3
	5-8	12	15.0
	9-10	10	12.5
	11-12	10	12.5
	Diploma and above	9	11.3
Marital status	Single	16	20
	Widowed	46	57.5
	Divorced	18	22.5

Source: Authors' Computation, 2014

3.1.2. Household Food Security Profile

To determine the household food security profile of the study area, the calculated household available energy was compared with the minimum subsistence requirement per adult equivalent per day (i.e.2100 kcal). The result indicated that, from the total sampled (80) female headed households, 52 households (65%) were found to be food secure and 28 households (35%) were found

food insecure. The average kilo calorie recorded for the food insecure and secure was 908 and 7896 kcal/AE/day, respectively. The energy intake of all households was 3121.74 kcal. The minimum and maximum calorie intake for food secured households was 2170 kcal and 7896 kcal, respectively; whereas the minimum and maximum calorie recorded for food insecure households was 908 kcal and 2097 kcal, respectively. The t-value (12.113) shows that there was significant mean difference between food secured and food insecure households (p=0.000***) (Table 3).

The food insecurity gap index (p) shows that food secure households exceeded the calorie requirement by 2.2 % while the food insecure households fell short of the calorie requirement by 1.5%. Each food insecure household needs only 1.5 % of the daily caloric requirement to bring them up to the recommended daily caloric requirement level, and then theoretically food insecure can be eliminated. On the other hand, the severity of food insecurity was 0.5%. In essence, as the poverty index tends towards zero, the degree of poverty diminishes (Whiteford & McGrath, 1994). This implies that the study area could be regarded as food secure given the fact that majority of the households were able to meet the recommended calorie intake of 2,100 Kcal per capita per a day. This result disagrees with the findings of recent studies (e.g. Tekle & Berhanu, 2015) in the same area of study. This can be justified with possible reasons like the dynamic feature of food security at household level, the difference in the study setting (as the previous studies had focused on rural farm households) as well as the difference on the study subjects, as this study was interested only on female –headed households.

Table 3: Food Security Status of Urban Female-Headed Households

Calorie consumed per adult equivalent in (kcal/person/day	**Food secure (N= 52)**	**Food insecure (N= 28)**	**Overall mean (N=80)**
Minimum	2170	908	908
Maximum	7896	2097	7896
Mean	3844.52	1779.43	3121.74
Std. deviation	1281.802	341.011	1443.227
Surplus/shortfall index	0.022	0.015	0.018
Severity index	---	0.005	---
Headcount ratio	0.023	0.350	0.005
t = 12.113	p= 0.000		

Source: Authors' survey (2014)

3.2. Determinants of Household Food Security Status

3.2.1. Descriptive Analysis

The descriptive statistics for continuous and discrete variables were presented separately

for the sake of convenience. The variables are helpful to observe differences among food insecure and secure households include age of household head, educational status, household size, dependency ratio, livestock ownership, household income, active labor force and health status of household head. The average age of household heads was 40 years whereas the average household size (AE) was 3.1 which are much lower than the average household size of Wolaita zone (WZFSD, 2013).

Table 4: Descriptive Statistics of Continuous Explanatory Variables

Variables	Total (N=80)		Food Secure (N=52(65%))	Food Insecure (N=28(35%))	t-value	p- value
	Min (Max)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*		
AGE (year)	18(68)	40.4(11.4)	37.50 (10.9)	45.9 (10.4)	3.345	0.001***
EDUCLVL (year)	0(15)	5.8(4.9)	6.63 (5.03)	4.2 (4.5)	-2.264	0.034**
FAMSIZE (AE)	0.75(6.50)	3.1(1.5)	2.5 (1.11)	4.31 (1.3)	6.702	0.000***
DEPRATIO	0(3)	0.93(0.7)	0.9 (0.7)	0.99 (0.62)	0.636	0.527
LIVOWN (TLU)	0(2.05)	0.3(0.6)	0.2 (0.6)	0.6(0.72)	1.461	0.151
HHINCOM (Birr)	2860(140)	1099.2(642.2)	1120.4 (651.2)	1059.8 (635.1)	-0.401	0.690
ACTLAFC	1(5)	2.2(1.02)	1.8 (0.73)	3.00 (0.98)	6.424	0.000***
HSOHH	0(11)	3.25(2.9)	2.08 (2.2)	5.43 (2.9)	5.809	0.000***

** p< 0.05; *** p< 0.01

Source: Household Survey (2014)

The results show that there is strong significant mean difference between food secure and insecure households with respect to age, educational status, family size, active labor force available in the family and household head's health status (Table 4). Similarly, a chi-square test for the discrete choice variables indicate that greater proportion of food secure households are employed, and practice urban agriculture (Table 5). And there is evidence for significant difference between food secured and insecure in engagement on urban agriculture, and possession of assets (Chi-

square=9.093; p=0.003 and Chi- square=6.190; p=0.013, respectively).

Table5: Descriptive Statistical Result for Discrete Explanatory Variables

Variables	Responses	Food security status				x^2	p-value
		Insecure		Secured			
		f	%	f	%		
Employment	yes	9	32.1	17	26.2	0.003	0.960
	no	19	67.9	35	53.8		
Urban agriculture	yes	19	67.9	35	53.8	9.093	0.003***
	no	9	32.1	17	26.2		
Asset possession	yes	22	78.6	26	50	6.190	0.013**
	no	6	21.4	26	50		
Saving account	yes	16	57.1	24	36.9	0.879	0.348
	no	12	42.9	28	43.1		
Receiving credit	yes	7	25	8	12.3	1.105	0.293
	no	21	75	44	67.7		
Receiving remittance and gift	yes	2	7.1	7	10.8	0.728	0.394
	no	26	92.9	45	69.2		

** p< 0.05; *** p< 0.01

Source: Household Survey (2014)

3.2.2. Econometric Analysis

A logistic regression analysis was conducted to identify determinants of food security for 80 female-headed householders using 14 variables assumed to have influence on household food security in different contexts. A test of the full model against a constant only model was statistically significant, indicating that the predictors as a set reliably distinguished between food secured and insecure (chi square = 66.037, *p = 0.000* with *df =14*). Out of the 14 variables seven of them were found to be significant predictors. Among the variables fitted into the model age of household head, educational level of household head, size of the family (AE), possessing assets, number of active labor force available in the household, health status of the household head, and practicing urban agriculture were found to be significant in determining household food security (Table 6).

The model reveals that age of the household head has significant (at less than 1% probability level), but negative relationship with household food security. This implies that as the age of a household increases by one unit, the odds ratio is in favour of a factor of 0.930 to food insecure household, while keeping other variables constant. In other words, the probability of being food insecure increases by a factor of 0.930 as the age of

female-headed household increases by one year, ceteris paribus. The possible explanation for such negative association is that an older female household head fails to compete and fit with urban job opportunities which are demanding energetic and productive human labor and therefore the older lady might be limited to domestic activities compared to young household heads. Young people spend much time on income generating activities and they are preferred by urban system than the older for a number of reasons. This finding disagrees with the findings claiming positive association between age of household head and food security, particularly in the context of rural households (Fekadu & Mequanent, 2010).

Table 6: The Logistic Regression Results For the Determinants of Food Security (Y=1)

Variables	Coefficients	Wald Statistics	Sig.	Odds Ratio
CONSTANT	0.619***	6.974	0.008	1.857
AGE	-0.72***	8.904	0.003	0.930
EDUCLVL	0.107**	4.364	0.037	1.112
FAMSIZ	-1.199***	19.971	0.000	0.302
DEPRATIO	-0.225	0.410	0.522	0.799
EMPLOY	-0.025	2.380	0.960	0.975
ACTLABF	1.712***	20.750	0.000	0.181
ASSTPOSS	1.299*	5.840	0.016	3.667
HHINCOM	0.454	0.164	0.686	1.000
LIVOWN	-0.568	2.354	0.125	0.566
REMITT	-0.704	0.705	0.401	0.495
SAVACC	0.442	0.875	0.350	1.556
CREDRCVD	0.606	1.086	0.297	1.833
URBNAGR	1.469***	8.597	0.003	4.346
HSOHH	-0.479***	18.040	0.000	0.619
-2 Log Likelihood	37.554			
Chi-square	66.037***			

* p<0.1; ** p< 0.05; *** p< 0.01

Source: Household Survey (2014)

As it has been hypothesized that education of household head has positive impact on state of household food security, the model output also revealed that it has positive association. Education was a significant predictor at less than 5% probability. Ceteris paribus, the probability of being food secure among female-headed households increases by a factor of 1.112 odds ratio as education level of

female headed households increase by one year formal schooling. Similarly, Bigsten, Kebede, Shimelis and Taddesse (2002) found that mother's educational status positively contributes to household food security.

Consistent with the hypothesis, household size (AE) has a negative significant (at p<1%) influence on household food security. The negative sign in the model output implies that family planning policies that will have an impact in reducing household size will increase the probability of a household to be food secure. The odds ratio in favor of food security decreases with increasing household size and was found to be 0.302. This implies, ceteris paribus, the odds ratio in favoring food security decreases by 0.302 as household size increases by one AE. This reaffirms the findings of others in which a household with large size, composed mainly of non-productive members, is more likely to be food insecure due to high burden levied on active labor (Bigsten *et al*., 2002).

The model also reveals the important role of active labor force in contributing to household food security as expected (at p<1%). In this circumstance, households with larger size of inactive labor force (with below 15 and above 65 years of age) generate inadequate income to purchase food items and fulfill family needs and thus, they are found to be food insecure. The odds ratio in favor of food security increases by a factor of 0.181 when active labor force increases by one person in the household. This finding is similar in agreement with the result of Aschalew (2006) which stated that active labor force had positively contributed to household food security.

Ownership of consumer durable and productive asset affects food security status positively and significantly at 5% probability level in the study area. The positive relationship may indicate that in the study area, households who own productive assets like machinery, small vehicles and etc are more food secure. This result fully agrees with prior expectation. The effect of asset possession implies that the probability of being food secure increases by a factor of 3.667 odds ratio as productive asset possession increases by one unit keeping other variables constant. This implies that asset possession in urban areas minimize expenditure on house rent and help in allocation of that equivalent money to food by guarantying food security status of households. This result confirms the findings of others (Girma, 2012; Bonnard, 2000).

Moreover, it indicates that engagement in urban agriculture, as one of basic means of producing immediate food items in urban areas, is significantly associated with food

security status of a household. Urban agriculture, which is mainly practiced in the home garden in this district, serves as means of coping mechanism during serious food shortage. This means households with large home garden produce more food for household consumption and for sale and have better chance to be food secure than those having relatively small size or none of it. The odds ratio for this variable is 4.346. This indicates that maintaining other determinants constant, additional practice and size of cultivable home garden will enhance food security status of the household by factor of 4.346 odds ratio and vice versa. This result is in agreement with the findings of Ejigayhu and Abdi-Khalil (2012) which deals about food security determinants in Addis Ababa city.

The health status of household head measure in the model is also consistent with the hypothesis in which the odds ratio (0.619) is against being food secure for each day when the household head is sick or absent from work in a year. This result conforms to the findings of the studies conducted elsewhere which have also shown a negative relationship between food security and health status of householder (Holden & Shiferaw, 2004).

Conclusion

The foregoing analysis attempted to identify determinants of urban female-headed household food security in Wolaita Sodo town. First, it attempted to describe socioeconomic characteristics of food insecure and food secure households by using descriptive statistics. Second, it attempted to identify factors that determine female-headed household's food security status using binary logit model of regression.

Accordingly, in the study area the proportion of households who were unable to fulfill their food energy requirement in the year 2014 was 35 %. The minimum and maximum kilo calorie recorded was 921.8 and 7896.3 kcal respectively. The result of the logistic regression model indicated that seven out of fourteen variables namely age of household head, educational level of household head, size of the family (AE), possessing asset, number of active labor force available in the household, health status of the householder, and practicing urban agriculture were found to be statistically significant as determinants of household food security in the study area. Age, family size, active labor force, household income, urban agriculture practice and health status were significant at less than one percent probability level while education status of the household head and possession of asset were significant at less than 5 %

probability level. Household size and age of household head were found to be negatively related with probability of being food secure whereas education, active labor force, residence ownership and engagement in urban agriculture were positively related with probability of being food secure.

Recommendations

As household size and food security are negatively related serious attention has to be given to limit the increasing population in the study area. This can be achieved by creating sufficient awareness to effective family planning strategies in the urban households. Further, household heads are advised to reduce the size of their household and their dependency ratio. Age has negative impact on food security. This means older households are more likely to be food insecure. Therefore, capacity building for old female household heads should be given. The effect of education on household food security status confirms the significant role of the variable in consideration for betterment of living condition. The more household head educated, the higher will be the probability of educating family members and access employment (both formal and self-employment) opportunities. So, strengthening both formal and informal education and vocational or skill training should be promoted to foster urban food security. Productive assets are highly binding resources and positively related with food security. Therefore, development partner support ought to scale up on existing urban cash-based credit and saving programs to ensure building up of assets for the asset poor households.

Surprisingly, the result does not support the significance of household monthly income in food security. This unexpected result is consistent with the study conducted in Mozambique (Garrett & Ruel, 1999). The findings indicated crucial contribution of different forms of assets to household food security. Development agents operating should implement capacity building anchors to push female household heads towards possession of productive and income generating household assets. The other pressing issue related to securing sufficient energy required for household is engagement in urban agriculture, which should be encouraged by governmental and development partner institutions for so many urban households. People should be aware of existing options to practice agriculture in urban areas if there is a need to lift food insecure households from their current situation. The health status of female householders negatively related with food security in the study area. Therefore, both government and civil society organizations

have roles to play in addressing these issues.

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