



Effect of Income dynamics on Household Food Security in Rural Communities, Evidence from Uganda

Margaret Namubiru

Uganda Technology and Management University
Email: namubirumeg@yahoo.com

Willy Ngaka

Centre for Lifelong Learning, Makerere University

Picho Odubuker Epiphany

Muni University

IJOTM

ISSN 2518-8623

Volume 4, Issue II

pp. 1-15, Dec 2019

ijotm.utamu.ac.ug

email: ijotm@utamu.ac.ug

Abstract

The Objective of the study was to investigate the effect of income dynamics on households' food security in rural economies with evidence from Uganda. The study was completely a desk review following a descriptive research design. First, the study reviewed empirical studies on income dynamics; and the effect of income on households' food security in rural areas. This was followed by an analysis of similar variables in Uganda using data from the Uganda National Household Surveys (2005/2006, 2009/2010, 2012/2013 and 2016/2017). Analytical findings indicated that while rural income is increasing, change in household income fluctuates significantly. Male headed households earn more income than female headed households. Moreover, income is higher in literate households compared to illiterate households. The study further found that while the subsistence sector is reducing in absolute terms, it remains the main source of income to rural households. Additionally, households' source of income varies from time to time. Study findings on household food security indicated that change in households' income significantly affect household food security through households' food expenditure. Change in household expenditure influence access to food, dietary diversity, and consumption. Further observations suggest that external shocks like inflation highly affect household food security in rural areas. The findings further state that rural agricultural programs have a positive correlation with income and household food security. In conclusion, while household income affects household food security in rural areas, the effect significantly vary with income changes. The study recommends for rural income stabilization strategies including economic diversification and commercialization of agriculture.

Key words: *Food Security, Uganda*

Introduction

Understanding the dynamics of income and household food security in rural areas is important for national policy. Rural areas represent the biggest percentage of households worldwide. According to Zolin (2016), 23% of the population in European Union territories, 50% in Europe and Asia, and 70% in Sub Saharan Africa live in rural areas. Similarly, over 50% of the population in East Africa live in rural areas. About 69% in Tanzania, 72% in Rwanda, 75% in Kenya and 84% in Uganda live in rural areas (BCF, 2016). Rural economies have remained very important players in production and supply of food.

They provide food to over 80% of the population in developing countries (FAO, 2015). A study by FAO-UN (2015) predicts that increase in urbanization will translate into increased market demand for food from 49% in 2009 to 70% in 2050. Abdullah (2017) denote that while 90% of rural households derive their livelihood from Agriculture, they are likely to suffer food insecurity because of income related shocks and reliance on agriculture that is subject to risk and uncertainties.

Not much research has been done to understand the dynamics of rural households' income and their effect on household food security in rural areas. Understanding the dynamics of household income can help in drawing practical policy strategies to address food insecurity. It is on this background that the study seeks to examine the dynamics of rural household income and analyze its effect on rural household food security, with evidence from Uganda.

Rural households' Income dynamics

This section examines literature on household income dynamics in rural areas, specifically focussing on household income levels and variations, household income and gender of household head, household income and household heads' education level, and household income sources.

Household Income levels and variations

Households' Income in rural areas is not static. Income greatly varies with seasons and shocks. This is supported by a number of studies from both developed and undeveloped countries. In Kenya, a study by Tavneet (2008) on rural income, inequality and poverty dynamics revealed major income variations between 1997 and 2007. In Cambodia, average households' monthly income per capita increased by 9% between 2004 and 2007 and also reduced by 9% in 2008. Similarly, household income increased in 2009 and 2010 and reduced in 2011(Tongkimsun, 2012).

Similar patterns in rural households' income have occurred in several other countries such as Mozambique, Ghana, Limpopo, Nigeria, and Uganda (Sudhanshu & Gilead, 1996; Sakyi, 2012; Alderman, 1992; Feoma et al., 2014; Shievely, 2012; Leliveld, 2013). In developed countries households income variations are minimal because agriculture is highly commercialized and the contribution of agriculture income to total households' income is very small. In German the contribution of agriculture income to total households' income is just 5% and 8% in Netherlands. The high contribution of agricultural income in low developed countries is mainly due to high dependency on the subsistence farming. More so, the share of in-kind income in rural households' total income in underdeveloped countries is gradually decreasing with increasing levels of commercialization (Cecilia, 2015).

The trend in agricultural commercialization is not predictable in some countries like Uganda. According to the Uganda National Household survey report (2017), the percentage of rural households deriving their income from substance agriculture decreased by 15% with an increase in commercialization from 2006 to 2010 and increased by 3.8% from 2013 to 2017.

The literatures reviewed revealed that households' dependent on subsistence production experienced more variation in income compared to households dependent on the commercial sector. The study proposed for intensive commercialization in the agricultural sector to reduce income variation in the rural areas.

Households' Income and Gender

Fadipe (2014) assert that gender of a household head is very important in determining the level of household income. The results of his study revealed that households' income is higher in male headed households than in female headed households. Besides being low, female households' income in rural areas is always volatile. This is confirmed by Tavneet, et al., (2008) study on rural incomes, inequality and poverty dynamics in Kenya. The study found that female headed households earn less income compared to male headed households. The study further found that women headed households' income is more variable compared to male headed households. Similarly, In Cambodia, households' income of female household heads is much lower and volatile in contrast to male headed households' income (Tongkimsun, 2012). Furthermore, Israr (2010) shows those households' income increases with the number of males in a household. A study by Cecilia (2015) on subsistence households' in Romania further shows that rural female headed households are more liable to income variations than male headed households.

The situation is not different in Uganda. A study on Gender by Uganda Bureau of Statistics (2013) indicate that majority of the households in rural areas are headed by men. The report however indicates that the number of female headed households in rural areas is increasing gradually and the number is bigger compared to urban areas. In addition, female headed households are earning less compared to male headed households (Wordbank, 2005; UBOS, 2013). The UNDP (2015) Uganda country gender assessment report revealed that about 90% of rural women are engaged in Agriculture with minimal opportunities for value chain. In addition, few female headed households in rural areas use fertilizers and modern farm inputs, majority lack access to market and agriculture information which are necessary factors for increasing households' income in rural areas.

The reviews indicate that the number of female headed households in rural areas is gradually increasing. More still, income variation is more in female headed households than male headed households. The study recommends for government strategies aimed at promoting social economic activates that encourage male household heads to work in rural areas and at the same time increase income in the female household heads in the rural areas.

Households' income and Education

Recent research shows that education significantly determines households' income levels. Aikaeli (2010) found that household heads' level of education significantly determines the size of household income. Households with an educated household head have high income compared to households with no education. According to Aikaeli (2010), an increase in education level by one percent would result into one third increases in the level of household income. A study by Sitakanta (2015) about Farmer education and household income on 11,625 households in India found that education increases household income per acre of land cultivated. The study revealed that education enables farmers to manage finance, use modern inputs, new technology, and give them the strength to take on risks. Besides, educated farmers stand high chances of diversifying their source of income. Nonetheless, the effect is more on nonfarm households than farm households. A similar study in China by Yang and An (2002) shows that in rural areas, education increases profit by 51%. Further, education enables agricultural households to access information on markets, prices, weather, and storage facilities which guides them in making better agricultural decisions and high household income. Another study by Busia (2011) on the determinants of poverty among households in Uganda found that education increases household income through increase

in productivity. This is further confirmed by (Wobst, 2006; Israr, 2010; and Hail, 2005) in similar studies.

These literatures revealed gaps among the educated and non educated households' heads engaged in the agriculture sector. The literatures show that educated household heads earn more income with fewer fluctuations compared to non educated households.

This study therefore, recommends for an increase in financial incentives such as low interest loans, agriculture subsidy funds, training of both educated household heads and non educated households in agriculture activities. Further, there is a need for governments to promote education programmes such as scholarships, vocational skills training and adult education to train non educated household heads in the rural areas to improve their efficiency levels and earn more income.

Households' income and source of income

While studies such as Aikaeli (2010); IFPRI (2008); Tongkimsun(2012); Schwarze(2004) shows that agriculture is the main source of income in rural households. In contrast, studies such as UNECE (2007) suggest that rural households derive their livelihood from a number of sources including non agricultural activities. According to Alobo (2015), in Sub Saharan Africa, the share of rural households' income from non income activities accounts to 35-50% of total household' income. Israr (2010) shows that growth in real income is high in households engaged in non-farm activities compared to farm activities. In rural Pakistan, households' income increased by 71% after households diversified their source of income. In Tanzania, the National Household Budget Survey data shows that the number of households deriving their income from non-farm activities increased from 42% in 2000/01 to 52% in 2007.

According to the Uganda National Household survey report of 2017 Subsistence agriculture remains the biggest source of income contributing over 53.9% to households' overall source of income. The report further shows that over 60% of income from subsistence agriculture is acquired seasonally. Moreover, 53.4% is obtained in cash and 41.7% in kind. While the share of subsistence source of income to overall household income source increased from 51.9% in 2013 to 53.9% in 2017, the contribution of non agriculture income decreased by 18% in the same period. This is a good indication that rural households' income is not still.

Reviewed studies indicate that subsistence agriculture is the main source of livelihood and income in rural areas. However income from subsistence sector highly fluctuates with weather and uncertainty. It is possible that increasing efficiency can increase production and productivity which are key determinants of rural household income. It is also important that governments promote commercial agriculture in the rural areas.

Income and households' food security

Income levels/ variation, and households' food security

Researches on household income and food security suggest a positive correlation. High income levels enable households to consume dietary diversity and maintain a balanced diet (Senawer, 2007). According to Syed (2010) income is highly correlated to food security.

Recent studies indicate that food insecurity is not an issue of food shortage but access to available foods. Wei-ting., (2015) found that 29% of the households in Oakland are food insecure because of low income and limited access to foods in the markets. The study further shows that children in

these families suffer from low malnutrition due to low nutrition contents especially iron in the foods consumed. Schwarze(2004) found that households' food insecurity in rural areas worsens during income shocks. Low income households suffer more when prices increase in times of shock. In periods of high prices, households cope by reducing dietary diversity and expensive food items even though nutritious. Additionally, Starcey & Shahla (2001) found that low purchasing power due to low income is one of the major causes of food insecurity in rural areas. He further suggests that low income countries suffer more from undernourishment than countries with high income levels. Sakyi (2012) suggest that households with less income spend most of their income on food especially in periods of low income. Tarasuk, et al., (2014) found that 45.3% of the population in Canada particularly in rural areas is food insecure due to low household income. Similarly, 45% of the rural households in the lowest quartile in Malawi suffer from severe food insecurity, while 80% are moderately food insecure. Additionally, in Egypt, resulting from low income, 56% of rural households in Upper Egypt are on the borderline of poor dietary consumption while 35% face poor dietary diversity and 88% resort to a low food diet during income shocks (IFPRI, 2013). Another study in Mozambique shows that change in rural households' income leads to fluctuations in food consumption, low use of improved inputs, and low market integration. Additionally, as income increases the substitution of cereals for tubers also increases (Sudhanshu& Mlay, 1996).

In Tanzania, a study in Dodoma municipality found that 93% of the households in unplanned settlements are food insecure while only 6.4% are food secure as a result of low purchasing power due to low income following low economic activities. (Dreze and Sen, 1989) contend that the link between caloric intake and nutrition well being depends on a number of factors besides income. Similarly, CFSVA (2013) report shows that resulting from low income, 43% of the rural households in Uganda face low dietary diversity and 71% are dependent on staple foods for consumption.

Households with male heads are more food secure compared to female headed households (Ifeoma, et al., 2014). According to UNDP (2015) rural female headed households in Uganda are more likely to be food insecure than male headed households. Female headed households face low productivity due to less use of modern farm inputs and fertilizers. Sakyi(2012) also found that 63% of female headed households in Ghana are more food insecure compared to male households(47%).

Ifeoma, et al., (2014) observed that households with literate heads are likely to be more food secure compared to the illiterate headed households. Sakyi (2012) also confirm that the level of food insecurity is high in illiterate households than literate households. Another study by Nyako(2013) on the relationship between education attainment and food security in Nigeria found that educated women have high chances of being food secure with less malnourished children compared to the illiterate households. The study found that education reduces households' food insecurity by 13% and 27% for highly educated household heads. These findings are consistent with many other studies like (Lockheed, 1980; Bashir, 2013; Makombe, 2010).

Source of household income further explain the divergence in households' food security. Households with off farm source of income experience less fluctuations in income compared to those depending on farm sources as their source of income and livelihood. Researches such as (Abdullah,2017; Tarasuk, 2014; Syed, 2010; Senawer, 2007; Sakyi, 2012; Schwarze, 2004; Sen, 1981) on household food security show that income is a good predictor of household food security in rural areas.

Conversely, other studies suggest no significant income relationship with households' food security. Coleman-Jensen et al.,(2011) indicate that income is not a good predictor of households' food security as 7% of the households who had high incomes in America experienced high food insecurity at that time. More so, about 58.9% of the households in the same country were found food secure amidst low incomes and high poverty levels.

Evidence shows a positive association of households' income and food security. High income households experience high levels of food security than low income households. Increasing income among low income households through extending agricultural subsidy funding, low interest business loans, and training will change lives of low income earners and hence improve household food security.

Food Security analytical/Theoretical Framework

For long, the definition and measurement of food security has attracted attention from different research scholars. Malthus (1989) assumed food security is a function of food availability determined by the level of production and growth in population. Francesco (2012) shows that stock, exports and imports are important in defining availability of food in a closed and open economy. In a closed economy, availability is measured by the level of production and food stocks while in an open economy availability is measured by production, stock, and net balance (exports and imports).

Maxwell & Weibe (1998) suggest a correlation of food security and production resources by showing that increase in access to production resources facilitates an increase in households' income which translates into access to food and other consumption entitlements resulting into better nutritional status.

Sen (1981) found that households' food security is achieved when households have access and exchange entitlements. Sen (1981) believe availability of food does not guarantee food access. And therefore food accessibility is a key requirement for food security. Because income and expenditure are key measures of accessibility, households' income is a major determinant of households' food security.

USAID (1995) emphasize Availability, Accessibility, and Utilization in defining household food security. On the other hand, FAO (2002) determines food security by availability, accessibility, stability, and utilization.

The study draws its theoretical conclusion from a review of Malthus (1989) theory "Essay on principle of population"; Sen (1977) theory of Food Available Decline (FAD); Sen (1981) Theory of entitlement; and Dean and Sharkey (2011) theory of food insecurity and access to food resources. Malthus(1989)'s theory assert that food insecurity arise from an overriding effect of the population growth over food production given that land is subject to the law of diminishing returns. The theory denotes that the population grows at a geometric rate while food production grows at an arithmetic rate. This imbalance results into limited food supply to match the growth in population.

The theory of Food Available Decline (FAD) also indicates that food insecurity result from decline in available food supply. In contrast, the theory of entitlement (1981) and theory of food insecurity and access to food attribute household food insecurity to lack or limited access to available food constrained by differences in physical and natural resource endowment. While most of the aforementioned research shows that accessibility is very important in predicting households' food security, only Sen (1981) work link households' income to food security. Therefore, Sen (1981)'s theory of entitlement offers an analytical strength for this study. The theory of entitlement is conceptualized on three key entitlements; Exchange,

E-mapping, and Transfer. Sen (1981) assert that food insecurity is more of a food inaccessibility problem than food supply. Due to differences in resource endowment most times famine exists alongside food abundance. Sen (1981) further denote that income is a key determinant of household food security. He believed that the poor are more susceptible to famine than the rich. Given income the rich are able to access food varieties in the market in both peak and off peak seasons.

Food security indicators

Analyzing the trends in variables that affect food security requires either directly measuring the deficiency in consumption requirements based on the average minimum requirements or measuring the potential of coming out of a deficit. Such measurement requires specific indicators. Nonetheless most of these indicators have been criticized in methodology, reliability, and accuracy.

Overtime, the Average dietary energy supply suggested by FAO has been used in several studies (Tembo, 2009; Ssewanyana, 2003) to measure food security by comparing the quantity of calories consumed to a universal threshold. While the method suits comparing dietary caloric intake across populations, it omits quality and other food security indicators such as access and stability.

The Global Food security Index indicator incorporates affordability, availability, and utilization. The index is generated from the prevalence of undernourishment, child underweight, and mortality. Meanwhile it captures a number of variables it ignores health issues and is subject to double recording and measurement as some of the variables are interrelated.

Poverty and hunger index assumes that poverty does not always lead to hunger because the correlation always varies in between the ends. The relationship between poverty rate and poverty gap is always significant. The index is therefore based on poverty indicators as used in the millennium Development Goals (Pangaribowo, 2013).

Anthropometric indicators consider stunting, underweight, and wasting with a supposition that food availability and access are not sufficient indicators of food security. While preparation, processing, and absorption are paramount in establishing the level of food security, it does not specify the form of nutrient inadequacy.

Diet Diversity Score is a recently used embraced indicator. It examines consumption of specific food groups in a reference period. Looking at diversity, the indicator is a good measure of access and availability. Besides a balanced diet, it is indicated by diversity in food consumption, and is a good indicator of nutrition wellbeing.

Francesco (2012) outlines seven main approaches in measuring food security. The Availability approach, Income approach, Basic needs approach, Entitlements approach, and Sustainable approaches such as dietary diversity, expenditure on food, consumption behaviour patterns, and experimental livelihood approach.

Maxwell et al, (2013) shows that indicators that combine behaviour and psychological measures, as well as self assessment measures are cross cutting. Nonetheless it is difficult to know which dimension they are specifically measuring. While each of the aforementioned indicators indicate food security, (Francesco, 2013; Barret, 2010; Pangaribowo, 2013; Coates, 2013) suggest that applicability of these indicators depends on the nature of the study and access to information. Most research interchanges the use of

accessibility indicators without minding the dimensions they intend to measure. The proportion of the population that is food insecure may also be underestimated if one indicator is used since the definition of food insecurity is holistic. Developing specific indicators for particular food security dimensions is more appropriate.

This study therefore used a multidimensional approach in analyzing the effects of income dynamics and rural households' food security in Uganda.

Methodology

The study was entirely a desk review following a descriptive research design. Data on income and households' food security was obtained from the Uganda National Household Surveys (2005/6, 2009/10, 2012/13, 2016/17) by the Uganda Bureau of Statistics. Study samples in the respective surveys were 7400 households for 2005/6, 6800 for 2009/10, 6897 for 2012/13 and 17320 for 2016/17 across the surveys. While National household surveys are important source of information on income and food security, such data on rural households is irregular and incomparable. Therefore, while the study reviewed several literatures on income dynamics and household food security in rural economies, the analysis was done in Uganda as a case study. The study used nominal average household income values in assessing income dynamics and households' food security because of irregularities in real average household.

Analysis of income dynamics was majorly descriptive supported by graphical and frequency representations. Food security was measured holistically by examining all the four dimensions of food security. Accessibility to food was indicated by the proportion of households' expenditure on food, and the number of households able to purchase salt from the market when it got finished. Availability was indicated by the number of meals consumed in a day and the number of children able to have breakfast. Stability was captured by nature of copying mechanism when ran out of salt. On the other hand Utilization was indicated by the type of breakfast for children below five years, supported by dietary diversity.

Findings and Discussions

Discussion of study findings is done in two parts. The first part discusses results on income dynamics in relation to income levels and variations, gender, education, and source of households' income. The second part focuses on the effect of income on households' food security.

Income dynamics in Uganda

Income levels and variation

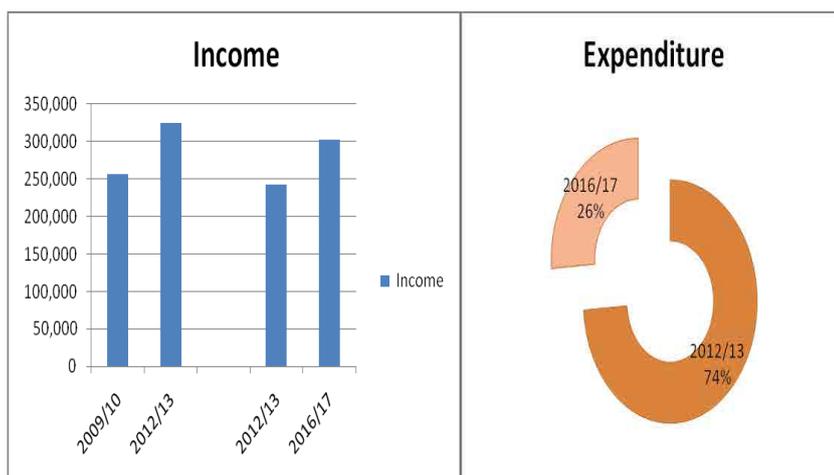
Overall, study findings specify an increase in rural households' income. Between 2009/10 and 2012/13, average monthly income increased by 26.4% from Sh.257, 000 in 2009/10 to Sh.325, 000 in 2012/13. Meanwhile in 2016/17 average households' income increased by 25% between 2012/13 and 2016/17. Nevertheless, while income levels have increased in the study survey period the trend is not linear. For example as average monthly income increased by 26.4% between 2009/10 and 2012/13, it only increased by 25% between 2012/13/ and 2016/17.

These trends indicate a shrink in income change of 1.4% as indicated in Fig I A below.

Similarly, Fig I indicate that household expenditure vary with income. In 2016/17, household expenditure dropped from 74% in 2012/13 to 26% as change in income dropped from 26.4% to 25% in the same period. These results are in conformity with (Tongkimsun, 2012; Tavneet, etal, 2008) studies which suggest that change in household income in rural areas is not predictable. The results thus suggest that rural households' income is subject to fluctuations.

The corresponding increase in average monthly income between 2009/10 and 2012/13 could be attributed to a number of factors. First, it was a period of considerable recovery in northern Uganda characterized by high social economic transformation with high agriculture production. The period was also characterized by huge trade with Southern Sudan, and a favorable agricultural climate. The variations can further be explained by the effects of the NAADS Program in rural areas. According to the 2008 impact assement report of the NAADS program, farmer's agriculture per capita income increased, as productivity increased by 27%. During this period, average agricultural income was estimated at Sh.20,213 for all the households that participated in the Programme. The negative income chage in 2012/13-2016/17 can thus be substantiated with the end of NAADS program in 2012. In addition, the period experienced a decline in commercial agriculture, drought, pests and diseases, and high sharp food prices resulting in increased household consumption expenditure from 328,200 in 2012/13 to 351,600 in 2016/17(UBOS,2017).

Fig. 1A. Households income level and Variation



Source: UNHS, 2016/17

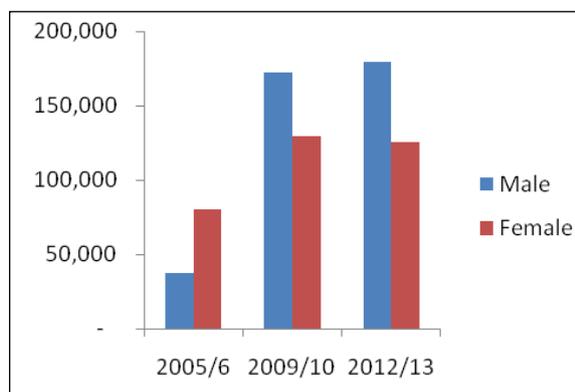
The above results do not differ from the income trend in developed countries. According to a study by Cecilia (2015) on subsistence economy and food security in rural Romania, agricultural household income highly depends on the agriculture climate. Between 2008 and 2009, household income from agriculture decreased to 28% from 46.5% in 2001 mainly due to unfavorable climate and low participation in commercial agriculture

Gender and households income

Further analysis on income and households' head revealed an irregular trend. In 2005/2006, female headed households earned more income (68%) than men (32%). Interestingly, between 2009/10 and 2012/13 male headed households' consistently earned more than women. In 2009/10 and 2012/13, women earned 43% and 41% respectively, lower than 57% and 59% average income for men in the same period.

The above trend is supported by several studies such as Israr, 2010; Fadipe, 2014; Tavneet., et al, (2008); and Tongkimsun, 2012. These studies indicate that male headed households earn more income compared to female headed households. According to WFP (2009), men have optimal control over households' resources and always assume a greater role in making decisions. Figure2 shows that in 2005/6, female headed households earned more than male headed households. Nevertheless in 2009/10 and 2012/13, male headed households earned more than female headed households.

Fig.2. Households income levels by gender of household head

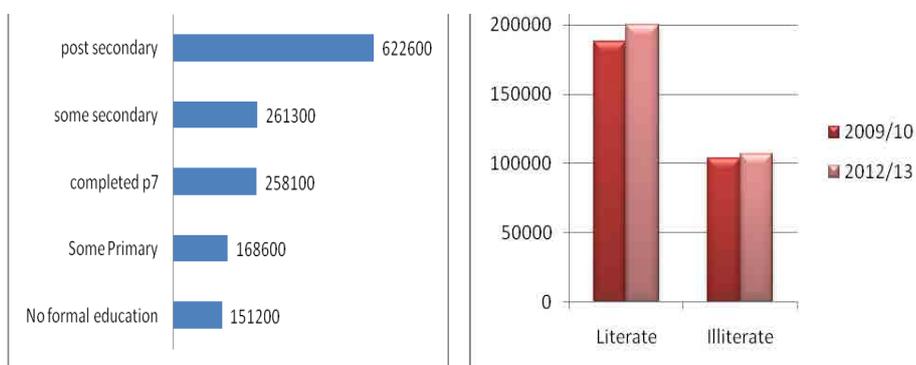


A study by Abdullah (2017) in Pakistan similarly shows that male headed households are more food secure compared to female headed households.

Education and Households income

In general, illiterate households earn less in contrast to literate households as indicated in figure3. In 2005/6, literate household heads earned 81% more income than illiterate household heads and in 2012/13 literate households earned 87% more income than illiterate household heads. Nevertheless, literate households headed by males had the highest level of income compared to their counterparts. Households with illiterate female heads had the lowest level of household income in all the survey periods. These results are validated by several researches on similar studies. (Wobst, 2006; Aikaeli, 2010; Israr, 2010; and Hail, 2005) denote that education of the household head significantly determines the level of households income. Households with Literate heads earn more income in contrast to illiterate household heads.

Fig.3. Households income by level of Education



Source: UNHS(UBOS, 2009/10; 2012/13)

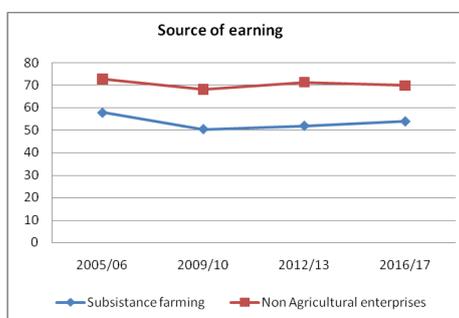
Households' income and source of income

The source of rural households' income is not predictable. While the percentage of the population deriving their source of income from subsistence agriculture decreased from 49.2% in 2005/6 to 41.8% in 2009/10, it again increased to 42.4% in 2012/13 from 41.8% in 2009/10. Similarly, the number of households earning their income from commercial farming increased from 2.7% in 2005/6 to 3.7% in 2009/10, and decreased to 1.8% in 2012/13. Nevertheless, although decreasing in absolute terms, the biggest proportion of households in Uganda derives their livelihood from subsistence agriculture. This is further supported by Aikaeli (2010); IFPRI (2008); Tongkimsun(2012); and Scwarze(2004) which shows that agriculture is the main source of income in rural areas.

A shrink in the number of households deriving their source of income from Subsistence agriculture could be attributed to the increase in the level of commercialization following NAADS implementation program. It could also be due to an increase in households participating in nonfarm activities in rural areas as supported by (UNECE, 2007; and Alobo, 2015).

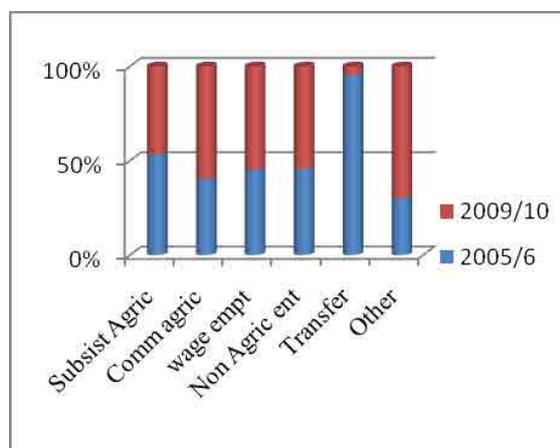
Fig.4. Share of agriculture source of income

Source: UNHS(UBOS,2009/10;2016/17)



Although the share of non agricultural source of income in rural areas is increasing gradually, the subsistence agriculture remains a core source of income for rural households. The study however reveals that rural households income increases with increase in households participation in non agriculture activities. In 2016/17, as the number of households deriving their income from non agriculture activities reduced from 19.4% to 15.9% the number of households deriving their income from subsistence agriculture increased by 2% and households income decreased by 25% in the same period.

Fig.5. Main source of earnings



Change in Income and Household Food Security in Uganda

Research (Leete et al., 2016; Tarasuk et al., 2014) assert that income is a major predictor of consumption expenditure and food security. Overall, study findings revealed that households' expenditure has been increasing with households' consumption expenditure in all the national survey phases. Between 2005/2006 and 2012/13, total households' expenditure increased by 16% as income increased. Nonetheless, in 2012/13, both income and households' expenditure increased at a decreasing rate indicating a negative trend. For example change in households' expenditure reduced from 12% in 2009/10 to 3% in 2012/13 as income reduced by 26% in the same period. Similarly, consumption growth rate reduced as income reduced in the same period.

A comparison of change in income by expenditure on food, drinks and tobacco revealed a similar pattern as shown in Fig.6. In 2009/10, households' expenditure on food and drinks increased to 50.8% from 49.5% and to 51.5% in 2012/13 as income increased. Interestingly, similar to the trend in total households' consumption expenditure and income, change in households' expenditure on food and drinks also increased at a decreasing rate. In 2012/13 change in households' expenditure on food and drinks decreased from 3% to 1% as change in income decreased in the same year. A similar assessment revealed that the number of households able to purchase salt when it got finished decreased from 48.5% to 47.8% as households income decreased in that year. Further, the number of households unable to buy salt when it got finished increased from 35% in 2009/10 to 49.2% in 2012/13 corresponding with a negative change in households income.

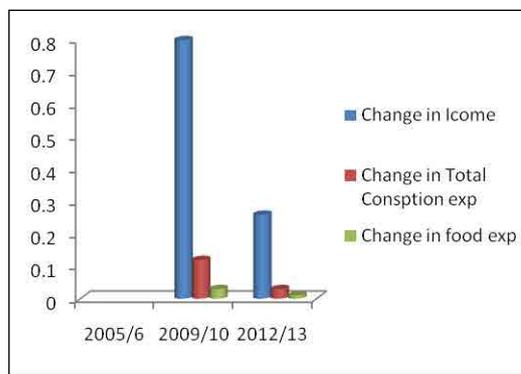
On the otherhand, a cross examination of change in income, change in food expenditure and change in consumption on the number of meals consumed in a day revealed a positive association. In 2012/2013, the number of people consuming one meal in a day increased by 1% with a negative change in income. This was further associated with a decrease in food expenditure from 3% to 1% in the same year. This is supported by Akter & Syed (2014) study on the effect of income shocks on households' food security. The study shows that in periods of income shocks households reduce the number and size of meals in a day. The pattern match the trend in inflation over the same period characterized by low inflation rate in 2005 below 10%, and high inflation between 2009 and 2012 of 2 digits. For example in February 2009 inflation was 14.2% and reached a peak of 30.5% in October 2011. Even though the rate of inflation reduced from 30.5% in the subsequent years, this was still high above 10% in 2012/13 implying low crop inflation. Researches such as Nyamekye (2017) and Wieland (2014) denote a correlation between inflation and consumption behaviours.

The above trend is confirmed by many other studies in both developed and developing countries. In 2015, a study by Cecilia on sustainable economy and food security in Romania found that income shocks affect households' food expenditure. Further, the study revealed that inflation directly influences households' food security through expenditure on food. Shievely (2012) note that 63% of total households' expenditure in rural areas is spent on food. Meanwhile Akter and Syed (2014) assert that in periods of price and income shocks households cope by reducing expenditure.

(Kukk, 2012; Jalan and Ravallion, 2001) shows that income shocks affects both low and high income households only that high income households recover much faster than the low income households. These finding are further substantiated by studies such as (Verpoorten, 2013; Sonia, 2014; FAO, 2009) showing that price shocks are significantly correlated with households food security.

These results imply that household consumption expenditure and food security is sensitive to income changes. Further, findings reveal a positive association between inflation and consumption patterns or behavior. This finding suggests a need for government, through monetary policies to control inflation in periods of income and price shocks for sustainable household food security.

Fig.6 Change in Households income and Expenditure



Conclusions

Although increasing, the rural households' income trend is uncertain. Results show that male headed households earn more income than female headed households. Nonetheless, households' income increases with the level of education of a household head.

Although reducing in absolute terms, Subsistence agriculture is the main source of income for rural households. Empirical studies however show that households who depend on non farm activities earn more income than those depending on farm activities, and the number of households dependent on non farm activities is increasing. Additionally, household income is higher in households with more than one source of income. In Uganda, while commercial agriculture is increasing, the trend is not uniform. Study findings further indicate that change in household income significantly affects households' access to food, dietary diversity, and consumption. As income increases, households' expenditure on food also increases and vice versa. Further observations suggest that households' income shocks such as inflation highly affects households' food security in rural areas. Conversely, Agricultural supporting programs play a significant role in improving rural households' income.

Governments, non government organizations, and other stakeholders need to identify and implement policies aimed at improving and stabilizing rural household income. Major emphasis should be directed towards reducing agricultural shocks and uncertainties, promoting economic diversification, intensifying and commercialization agriculture, and make agriculture attractive to all categories of the population including men and the highly educated through awareness and sensitization programmes.

References

- Aikaeli, J. (2010). Determinants of Rural Income in Tanzania: An Empirical Approach. *Journal of Research on Poverty Alleviation* (REPOA).
- Akter, S., & Syed, A. B. (2014). *The Impacts of Price and Income Shocks on Household Food Security and Economic Wellbeing: Evidence from Rural Bangladesh*. Helmholtz Centre for Environmental Research – UFZ, Leipzig, Germany, Palgrave Macmillan, London.
- Alderman, H. (1992). *Income and Food Security in Ghana*. Cornell Food and Nutrition Policy program
- Alobo, S. (2015). *Determinants of Rural Household Income Diversification in Senegal and Kenya*. UMR, MOISA,

- CIRAD; TA C-99/15; 73 Jean François Breton 34398 Montpellier Cedex 5 - France
- Andre' Leliveld, T.D. (2013). *Agricultural Dynamics and Food Security Trends in Uganda*. Overseas Development Institute, 111 Westminster Bridge Road, London SE1 7JD, Washington, D.C
- Bahigwa, B.A Godfrey. (2002). Rural food Security in Uganda: An Empirical Analysis. *Eastern Africa Journal of Rural Development* 18, 8-23
- Barrett, Christopher. (2010). Measuring Food Insecurity. *Science*, 327: 825–828
- Beyond Capital Fund (BCF). (2016). *Agriculture and Food Security at BOP*. India and East Africa Spring
- Dreze, J. and Sen, A. (1989). *Hunger and Public Action*. Oxford University Press, Oxford
- Fadipe, A.E, Adenuga, A.H., Lawal.A.(2014). *Analysis of Income Determinants among Rural Households in Kwara State in Nigeria*. Department of Agricultural Economics and Farm Management, University of Ilorin, Ilorin, Nigeria
- FAO. (2002). *State of food insecurity in the world 2001*. Rome
- FAO.(2009). *The State of Food Insecurity in the World*. Food and Agriculture Organization, Rome
- FAO.(2015). *The State of Food Insecurity 2015*. Rome
- FAO-UN.(2015). *The State of Agricultural Commodity Markets: Trade and Food Security, achieving a better balance between national priorities and the collective goods*. Rome.
- Francesco, B. and Pasquale, D.M.(2012). *A Human Development and Capability Approach to Food Security: Conceptual Framework and Information basis*
- Haile, H.K., Alemu, Z.G., and Kudhlande, G.(2005). *Causes of Household Food Insecurity in Koredegaga Peasant Association, Oromiya zone, Ethiopia*. University of Free State Africa. pp.190-205
- Ifeoma, J.I. Agwu, E.(2014). Assessment of Food Security Situation among Farming Households in Rural areas of Kano State, Nigeria. *Journal of Central European Agriculture*, 15(1)
- IFPRI. (2008). *Validation of Food Frequency and Dietary Diversity as Proxy Indicators for Household Food Security*. IFPRI Washington DC
- Israr, M.(2010). *Determinants of Rural Households Income for Livelihood in Northern Pakistan*. University of Agriculture, Pashawar
- Jalan, J. and Ravallion, M. (2001). *Household Income Dynamics in Rural China*. Policy Research Working Paper Series, No. 2706. The World Bank, Washington, DC
- Joachim Von Braun, H. B.-L. (1992). *Improving Food Security of the poor: Concept, Policy, and Programs*. International Food Policy Research Institute D.C. 20036 U.S.A
- John, K.M. & Wobst, P. (2006). *Determinants of rural labor market participation in Tanzania*. ZEF Working Paper Series, Department of Political and Cultural Change Center for Development Research, University of Bonn
- Kassie, M., Ndiritu, S.W., and Stage, J.(2014). What determines Gender Inequality in Household Food Security in Kenya?: Application of Exogenous Switching Treatment Regression. *World Development*, 56: 153-171
- Kukk, M., Kulikov, D., Staehr, K., (2012). *Consumption Sensitivities in Estonia: Income Shocks of Different Persistence*. Working Papers of Eesti Pank No. 3/2012, Tallinn, Estonia
- Leete, Laura and Bania, Neil.(2010). The effect of income shocks on food insufficiency. *Rev Econ Household*, 8.5.5-526.10.1007/s1
- Maxwell, Daniel Jennifer Coates, and Bapu Vaitla.(2013). *How do different Indicators of Household food security compare?: Empirical Evidence from Tigray*. Feinstein International Center, Tufts University, Medford, USA
- Muula, P. & Chiweza, A. (2013). *The State of Food Insecurity in Blantyre City, Malawi*. African Food Security Urban Network (AFSUN)
- Ndatira, C. & Mukiza.(2011). *Macro Economic Statistics Directorate*. Staff working Paper, UBOS
- Pangaribowo, E. H., Gerber, N., Torero, Maximo. (2013). *Food and Nutrition Security Indicators: A Review*. ZEF Working Paper Series, ISSN 1864-6638 Department of Political and Cultural Change Center for Development Research, University of Bonn
- Sakyi, P.(2012). *Determinants of Food Accessibility of Rural Households in Limpopo Province, South Africa*. Ghent University.
- Schwarze, S.(2004). *Determinants of Income Generating Activities of Rural Households*. Institute of Rural Development, University of Göttingen
- Sen, A. (1981). *Poverty and Famines: An Essay on Entitlement and Deprivation*. Oxford: Clarendon Press
- Shevely, G., Hao J. (2012). *A Review of Agriculture, Food Security and Human Nutrition Issues in Uganda*. Department of Agricultural Economics Purdue University West Lafayette, IN 47907
- Ssewanyana, S. (2003). *Food Security and Child Nutrition Status among Urban Poor Households in Uganda: Implications for Poverty Alleviation*. AERC Research Paper 130 African Economic Research Consortium, Nairobi

- Stacey, R., & Shahla, S. (2001). *Issues in Food Security: Effects of Income Distribution on Food Security*. United States Department of Agriculture Information Bulletin no. 765-2(2001)
- Sudhanshu, H. & Gilead, M.(1996). *Food Consumption Patterns, Seasonality, & Market Access in Mozambique*. Development Southern Africa
- Tarasuk, V., Mitchell A., Dachner, N. (2014). Household Food Insecurity in Canada, 2012. Toronto: Research to Identify Policy Options to reduce food insecurity (PROOF)
- Tavneet, S. et al., (2008). *Rural Incomes, Inequality and Poverty Dynamics in Kenya*. Tegemeo Institute of Agricultural Policy and Development
- Tembo, D.(2009). *The Effect of Market Accessibility on Household Food Security: Evidence from Malawi*. University of Hamburg, October 6-8, 2009
- TongKimsun, L.P. & Sry, B.(2013). *Levels and Sources of Households' Income in Rural Cambodia*. CDRI Working Paper Series No. 83/CDRI Working Paper Series No. 83.
- UBOS. (2013). *Comprehensive Food Security and Vulnerability Analysis, Uganda (CFSVA)*. Uganda Bureau of Statistics, Statistics House, Kampala
- UBOS. (2006). *Uganda National Households Survey 2005/06*. Retrieved from <https://www.ubos.org/explore-statistics/70/>
- UBOS. (2010). *Uganda National Households Survey 2009/10*. Retrieved from <https://www.ubos.org/explore-statistics/70/>
- UBOS.(2014). *Uganda National Households Survey 2012/13*. Retrieved from <https://www.ubos.org/explore-statistics/70/>
- UBOS.(2017). *Uganda National Households Survey 2016/17*. Retrieved from <https://www.ubos.org/explore-statistics/70/>
- United Nations Economic Commission for Europe (UNECE). (2007). *Rural Households Livelihood and Well being: Statistics on Rural Development and Agriculture households' Income*, UNECE
- USDA. (2015). *Household Food Security in the U.S.A: A report from the Economic Research Service*
- Verpoorten, M., Arora, A., Stoop, N., Swinnen, J., (2013). Self-reported Food Insecurity in Africa during Food Price Crisis. *Food Policy* 39, 51–63
- Wei-ting, C., Megan, L. C., and Palmer, A. (2015). *Community Food Security in the United States: A Survey of Scientific Literature*. Johns Hopkins Center for a Livable Future Bloomberg School of Public Health. Volume II.
- Zolin, M. B. (2016). *Economics of Rural Development*. Retrieved from https://www.google.com/?gws_rd=ssl#q=m.b.zolin+2015-2016+economics+of+rural+development