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Economic impact of HIV/AIDS on rural farm households' food security in Ethiopia: The case of Raya Kobo Woreda

Dr. G Nagaraja and Kibrom Kahsu Hailu

Abstract

Availability of accurate information on how and to what extent households are affected by HIV/AIDS is a starting point for designing effective intervention programmes to mitigate the impact of the pandemic. This study was initiated with the aim of investigating the impact of the epidemic on food security of rural farm households' and was carried out in Raya Kobo Woreda by collecting data from a total of 130 households, of which 65 of them are HIV/AIDS affected. Results of the study show that HIV/AIDS affected human capital of the affected households, which was reflected on household's composition and dependency ratio of the affected households. The average size of land (0.655 hectare) and livestock (0.384 TLU) owned by HIV/AIDS affected households was significantly lower compared to 0.755 hectare and 2.93 TLU respectively for non-affected households in the study area. Moreover, the finding from this study also tended to indicate that HIV/AIDS significantly depleted the financial resources of the affected households in that they were forced to spend money on medical and funeral expenses. Furthermore, result of a logistic regression analysis shows that HIV/AIDS affected households were found to be less likely than the non-affected households in falling into 'Better' dietary diversity score category. Based on the finding of this study, we recommend that any intervention programme aimed at mitigating the impact of HIV/AIDS should focus on strengthening the capacity of the HIV/AIDS affected households in rural areas by improving their access to the limited resources, promoting labor/capital-saving technologies and developing technologies that can make optimal use of limited resources.

Keywords: HIV/AIDS, Affected and Non-Affected Households, food Security, Impact

Introduction

Background

The overall growth of the global AIDS epidemic appears to have stabilized and the annual number of new HIV infections has been steadily declining since the late 1990s. There are fewer AIDS related deaths largely due to the significant scaling up of antiretroviral therapy over the past few years. The number of new infections has been steadily falling although the overall levels of new infections still remain high. With the apparent significant reductions in AIDS related mortality, the number of people living with HIV worldwide has increased. According to UNAIDS report of 2015, the total number of people living with HIV/AIDS worldwide, at the end of 2014, is 36.9 million [34.3 million – 41.1 million] and the number of adults and children new infection by HIV/AIDS is 2 million [1.9 million – 2.2 million]. Sub-Saharan Africa still bears an inordinate share of the global HIV burden. Although the rate of new HIV infections in the sub-continent has decreased, the total number of people living with HIV continued rising. The estimated 790,000 [670,000 – 990,000] people who died of HIV related illnesses in sub-Saharan Africa in 2014 accounted for as many as 65 percent of the global total of 1.2 million [980,000 to 1.6 million] deaths attributable to the HIV/AIDS epidemic. The majority of Africans live in rural areas, where labor intensive agriculture is the mainstay of the economy (UNAIDS, 2015) [28].

According to the single point estimate, the national HIV prevalence rate in 2010 was 2.4% with an estimated 1,216,908 people living with HIV in Ethiopia. In major urban settings, the epidemic is on the decline while it is stabilizing in rural areas. However, there is significant

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variation in the magnitude of the epidemic among geographic areas and population groups (MOH/FHAPCO, 2009).

Addressing food insecurity has top priority in Ethiopia's development policies. Given the linkages between food insecurity and HIV/AIDS (extensively documented throughout Africa), it is important to consider the added dimension that HIV/AIDS places on food security if efforts to promote food security are not to be derailed as HIV infection spreads within the country particularly to the rural areas. Given the spread of HIV infection in the rural areas, it looks plausible to suspect the possibility that semi-subsistence farming systems that very much prevail in rural Ethiopia may be seriously weakened by the incidence of HIV/AIDS exacerbating the food insecurity which is already high in Ethiopia (Laketch, 2004) [16].

Statement of the Problem

The rural economy of Ethiopia mainly depends on agricultural sector which is characterized by subsistence production, the productivity of which mainly depends on the availability of active labor input. This implies that agriculture requires a strong and healthy labor force. However, available evidence shows that HIV/AIDS pandemic affects the quantity and quality of productive labor through the death and chronic illness of household members in productive and reproductive age group, through the amount of time taken by others to care for the chronically sick (taking into account HIV/AIDS is a protracted illness), time lost during customary mourning period and loss in knowledge/skills transfers available for agriculture WFP (Alemtsehai and Tsegazeab, 2008) [1]. Although there are enough epidemiological studies from a critical component of HIV/AIDS research, far more work is needed to explore the long-term impacts of the disease on broader socio-economic and development issues. Above all, the impact of HIV/AIDS on household food security has been placed at the forefront of these research agendas, as HIV/AIDS is widely acknowledged to be exacerbating poor nutrition and food insecurity in developing countries (Gillespie and Kadiyala 2005).

In Ethiopia, studies on the economic impact of HIV/AIDS in rural areas are very limited both in number and in their scope. Moreover, only few studies were conducted in this important area. For example, Laketch (2004) [16] and Alemtsehai and Tsegazeab (2008) [1] have conducted studies in different parts of the rural areas of Ethiopia mainly focusing on the impact of the pandemic on food security. This study is the first of its kind in the study area and it is designed to sufficiently focus on the quantitative and qualitative measurement on the impact of the epidemic with the aim of answering the following important questions:

- ☞ To what extent does HIV/AIDS changes the various aspects of food security status of rural households?
- ☞ What is the effect of HIV/AIDS on the physical capital of HIV/AIDS affected households?
- ☞ How does HIV/AIDS affect the human capital of HIV/AIDS affected rural households?, and
- ☞ What is the linkage between HIV/AIDS and the financial capital of the households?

Objective of the Study

The overall objective of the study was to investigate the economic impacts of HIV/AIDS on rural household's food

security position in the study area. Specifically, the study was intended:

- To investigate how HIV/AIDS changes the various aspects of the food security status of rural households;
- To examine the effect of HIV/AIDS on the Physical capital of the HIV/AIDS affected households;
- To examine how HIV/AIDS affect human capital of the rural households; and
- To explore the impact of HIV/AIDS on the financial capital of the rural households

Chapter Two

Review of Related Literature

Theoretical Literature

The Potential Economic Impact of HIV/AIDS

AIDS creates severe economic impacts. Premature adult mortality is assumed to occur about a decade into full adulthood, this being the median time from infection to death in the absence of treatment with antiretroviral drugs. The economic effects will vary according to the severity of the AIDS epidemic and the structure of the individual and his/her household, the community and the national economy (Alison, 2005) [2].

According to Alison (2005) [2] and Lori & John (1999) [17], HIV/AIDS cause reduction in labor supply due to morbidity and mortality. Increased costs to deal with such losses are the two major and severe effects of the HIV/AIDS. According to Ishrat & Peter (2002) [12], HIV/AIDS creates a vicious cycle in three ways. First, that HIV/AIDS has an impact at all levels of the economic system; macro, meso and household; and these interrelated impacts feed to each other creating a vicious cycle. Second, HIV/AIDS impact at all levels manifestly reflected by three main indicators: the loss of manpower and skills; changes in the population structure and the erosion of the whole production and consumption bands, with subsequent distortion in the resource allocation due to changes in demand for goods and services; deterioration in the management capacity and governance. Thirdly, the most direct impact of HIV/AIDS is morbidity and mortality at the household level, which is the basic building block of the economy. It reduces their ability to work leading to inability to generate adequate income, save and invest increasing their vulnerability and dependency on the state. These factors change the extent and nature of demand for the services and output of different sectors such as agriculture, education and health, and will place unprecedented strain on social service delivery.

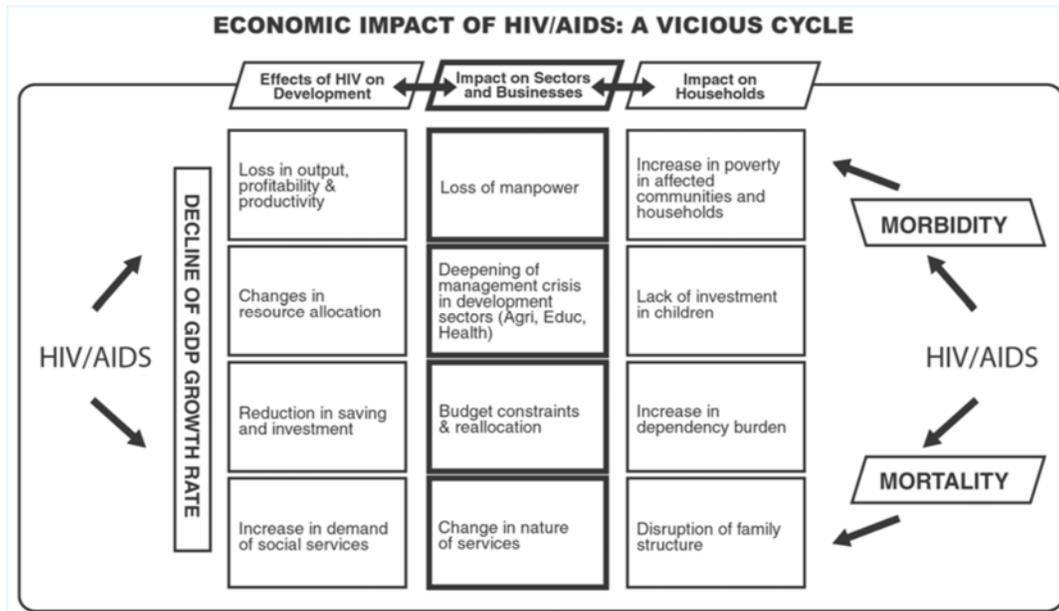
General Linkages between HIV/AIDS and Food Security

Various impact assessment studies have reflected both quantitative and qualitative impacts of HIV/AIDS on different aspects of the rural community, such as labor quality and quantity, income and food purchasing power, household food production and expenditure pattern (Kutlwano, 2005; Reneth & Innocent, 2006; and Masuku & Sithole, 2009) [15, 24, 18].

According to Kutlwano (2005) [15], adult morbidity and consequently mortality may lead to reallocation and/or withdrawal of labor, therefore resulting in numerous changes and shifts within and outside the household. Thus, the pandemic directly put a burden on the livelihood of rural households through its negative impact on labor productivity as a result of morbidity and/or mortality which tend family members to spend time caring for the sick and

leading to the reduction of time by family members for productive activities (Reneth & Innocent, 2006) [24]. Most obviously, HIV/AIDS affects both the quantity and quality of labor (human capital), the one through which the overall impact of HIV/AIDS starts, due to the facts that it deprives valuable labor skills and knowledge as the sick people may abandon their occupations and die before they have been able to transfer their knowledge and expertise to the next generation (NAADS, 2003) [20], severe illness and death of adults in their prime age by HIV/AIDS curtail the ability of individuals to transfer knowledge both within their generation and for the following generation Gillespie and Haddad, 2001) [9], household on and off farm labor quality and quantity may be reduced, first in terms of productivity, when HIV infected persons fall sick, and later, when the supply of household labor declines because of patient care and death (Topouzis, 1999 and Klerk, *et al.* 2004) [27, 13] and morbidity and/or mortality reduce labor quantity through absenteeism or death of agricultural workers. Morbidity may also directly affect the quantity and quality of labor to the household because the sick may abstain completely or partially from working during the period of illness and indirectly through diverting the productive labor to the caring activity of the sick (ECA, 2006 and Okyere *et al.*, 2010) [22]. Another way of examining the impact of HIV/AIDS on the household's ability to gain access to food is to look at household income from the point of view of both from the agricultural and non agricultural activities (Klerk, *et al.*, 2004 and Masuku & Sithole, 2009) [13, 18]. HIV/AIDS has a marked impact on on-farm and off-farm income of the HIV/AIDS affected households which might be in the form

of losses in assets, savings, remittances, etc (Topouzis, 1999) [27]. It affects income not only through a decline in the quantity and quality of a labor force via sickness and death of a household member, but also through the reallocation of time to the care of the sick by other household members which were previously devoted to income generating agricultural and non agricultural activities (Alison, 2005) [2]. Thus, HIV/AIDS is a unique epidemic with a potential direct negative effect on household's income through reducing the quantity, quality disrupting the stability of income earning activities (Klerk, *et al.*, 2004) [13]. Moreover, there are four pathways through which impact of HIV/AIDS can be analyzed. Farm production can be affected by HIV/AIDS infection is: through its impacts on labor, knowledge, capital, and land (Antony & T.S, 2005; Reneth & Innocent, 2006, and NAADS, 2003) [3, 24, 20]. According to Antony & T.S (2005) [3], the pathways are interrelated to each other. Reduction in household size may exacerbate labor shortage, forcing households to cut back on the land to be cultivated or switch to labor saving crops. Death of an adult member of the household may also entail a loss of agricultural husbandry, management and marketing knowledge, requiring changes in the crop mixes. Because of cash constraints imposed on a household after incurring a loss of adult household member, crop mix and intensity of input application may be changed. Lastly, and especially in cases where the more household head dies, the widow and her dependents may have insecure land tenure rights and thus the occurrence of lose a part or all of the land that was formerly owned and cultivated by the family (Antony & T.S, 2005) [3].



Source: Adopted from Ishrat and Peter (2002) [12]

Fig 2: Economic Impact of HIV/AIDS

Empirical Literature

Impacts on Labor Quantity and Quality

Mauren & Nafula (2003) has conducted a study to estimate average labor productivity loss due to HIV/AIDS using a macro econometric model known KTMM. Finding of their study revealed that HIV/AIDS reduces labor productivity by 8%.

An impact assessment study conducted by Petronella *et al.* (2006) [23] in South Africa revealed that HIV/AIDS affected households have significantly suffered labor loss due to HIV morbidity and AIDS mortality. According to the finding of this study, labor loss was higher due to illness and death in HIV/AIDS affected households as compared to the non-affected households. On average, losses of labor were 7.13

hours and 6.24 hours for death and illness affected households, respectively, whilst it was only 0.34 hours per day for non affected households. The results were found statistically significant at 5% level of significance. Similar impact assessment study conducted by Gebrehiwot (2005) ^[8] in Ethiopia, using an effective labor supply econometric model, indicated that average effective labor supply of the affected households was significantly lower compared to the non- affected averaging 1.85 and 3.19 man equivalent days, respectively. Thus, any supposition that HIV/AIDS affects the quantity and quality of labor force appears to be supported by the empirical findings of many studies, although the magnitude of its impact is not well investigated.

Impact on Income and Food Purchasing Power

A number of studies have been done to investigate the impact of HIV/AIDS on household's income, among many other objectives. For example, the finding from two studies conducted in Ethiopia by Alemtehai & Tsegazeab (2008) ^[1] and in Thailand by Sumalea *et al.* (2000) ^[26] show that the average annual income of HIV/AIDS affected households was significantly lower compared to the non-affected ones. According to Alemtehai & Tsegazeab (2008) ^[1], the average income for the HIV/AIDS affected households were birr 1,877 while it was birr 2,860 for the non-affected ones. Similarly, the average annual income for HIV/AIDS affected households who experienced death of a household member were significantly lower by 34% and 47% than the income for households who experienced death from other causes and the income for households that had not experienced death, respectively (Sumalea *et al.*, 2000) ^[26]. Result of a regression analysis from a study that was conducted by Petronella *et al.* (2006) ^[23] indicated that households affected by HIV/AIDS and related chronic illness experienced a reduction in their off farm income but the effects were not statistically significant. Therefore, by killing young adults, the key earners of farm and non farm income, HIV/AIDS dramatically reduces households earning power and their ability to buy food and other essential goods and services (Barnett & Ruganema, 2001).

Impact on Household Food Production

Using a qualitative method, Kutlwano (2005) ^[15] has conducted a study in Botswana aiming at investigating the effects of HIV/AIDS on household's food security and the finding suggested that HIV/AIDS appeared to have a negative impact on agricultural production as some of the households had to abandon farming due to sickness in the family to the extent of choosing not to farm at all during the time of severe illness of the family member. One study from Uganda found out that there have been significant differences in both the size of the cultivated cropland and also in the production of cash & food crops among HIV/AIDS affected and non-affected households (NAADS 2003) ^[20]. The finding from this study further suggested that HIV/AIDS affected households reduced the overall area of cropland that they cultivated and production of cash crops, but have increased their food crops whilst the non affected households have increased the areas of cultivated cropland and production of cash crops, but they have decreased the production of food crops.

HIV/AIDS affected households have been also found to be less productive in crop production compared to non-affected households in various African countries as diverse as Uganda, Swaziland, South Africa and Zambia (Masuku & Sithole, 2009; Reneth & Mano, 2006; Petronella *et al.*, 2006; Antony & T.S, 2005) ^[18, 24, 23, 3]. Although the coefficients in some of these studies showed negative relationship between HIV/AIDS proxy variables and household's crop production, the result were not statistically significant. However, the study finding from Reneth & Mano (2006) ^[24], suggested that HIV/AIDS proxy variables were found to have a statistically significant negative impact on cash crop production implying an adverse effect of HIV/AIDS on affected household's decision to substitute cash crop production for food crop.

Chapter Three

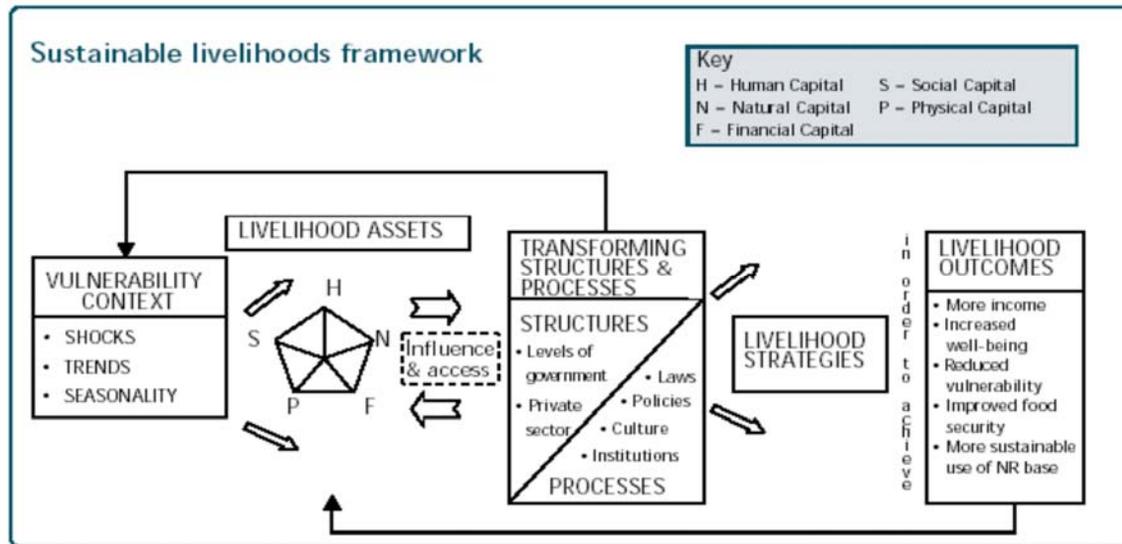
Study Methodology

Analytical Framework for Measuring Impact on Food Security

A number of studies in the area have widely used the sustainable livelihood framework (SLF) approach to measure the impact of HIV/AIDS on household's food security. According to O'Donnell (2004) ^[21], the Sustainable Livelihoods Framework potentially provides quite a clear basis on how HIV/AIDS can impact on various aspects of livelihoods in many different ways. The framework depicts livelihoods as being determined in the first instance by the range of assets available to the household. In this study, we proposed that the analytical tool of the Sustainable Livelihoods Framework (SLF) is a particularly useful framework to operationalize food security measurement in the context of HIV and AIDS since the Framework enables to figure out the impact of HIV/AIDS on rural households in the most excellent way.

The Sustainable Livelihoods Framework has provided quite a clear basis for understanding how HIV/AIDS can impact on various aspects of livelihoods in many different ways. The framework depicts livelihoods as being determined in the first instance by the range of assets available to the household. "Assets" is used as a broad term, and five categories of assets or capital are identified (DFID, 1997). These are:

- Human: It represents the skills, knowledge, ability to labor and good health that together enable people to pursue different livelihood strategies and achieve their livelihood objectives.
- Social: the social resources upon which people draw in pursuit of their livelihood objectives, including networks, membership of formal and informal groups, and relationships of trust and reciprocity.
- Natural: the natural resource stocks from which resource flows and services useful for livelihoods are derived (e.g. lands, trees, water sources)
- Physical capital comprises the basic infrastructure and producer goods needed to support livelihoods (e.g. buildings, roads/ transport, water supply, communications)
- Financial: the financial resources that people use to achieve their livelihood objectives, including stocks (savings, convertible assets, including livestock) and flows of income.



Source: DFID (1999), Sustainable Livelihood Framework Guidance sheets

Fig 4: The Sustainable Livelihood Framework

The framework underlines that illnesses and deaths due to AIDS have both an immediate and a long-term impact on households' and communities' vulnerability to food insecurity. It suggests considering the direct impact of AIDS at all levels of livelihoods (human, financial, social, natural and physical) as well as the indirect impact that policies, institutions and processes have on livelihoods. Finally, it draws attention to the feedback loop generated by the epidemic: livelihood assets are often negatively impacted by AIDS; livelihood strategies are usually adapted in response to HIV/AIDS, but the strategies can hardly avoid the increase in poverty and food insecurity. This increases susceptibility to HIV/AIDS (WFP, 2008).

The hypothesis is that HIV/AIDS is a shock that impacts on all classes of assets. Human capital is lost through chronic illness and death of prime age labor as well as loss of skills and knowledge transfer. Financial capital is undermined due to: i) increased health care & funerals expenditure, ii) reduced income (through loss of productivity), iii) decrease in assets ownership (assets are sold to make up for lost income). Social capital is damaged as structures at the household and community level are affected. Physical and natural capitals are damaged through loss of labor which affects the ability to farm and maintain common property.

Source and Type of Data

The study made use of Primary data of both quantitative and qualitative nature collected by field based household survey on sample households. Secondary data, obtained from various sources, was also used as a supplementary to the primary data for the purpose of generating background information on farming and livelihood systems, socio-cultural features of the population in the study areas, morbidity and mortality levels over time and in presenting trends of HIV/AIDS prevalence in the study area as well as the country.

Sampling Design AND Sample Size Determination

Two stage sampling design was used for the survey. Accordingly, Five KAs, which constituted the primary sampling units, were selected in accordance of their rate of HIV prevalence, cultural conditions, traditional norms and

socioeconomic conditions. That is, purposive sampling technique was applied for the purpose of selecting KAs to be included in the survey.

At the next stage, list of households affected by HIV/AIDS, which was prepared by the association of HIV/AIDS affected households of the Woreda, in the selected KAs were used as a secondary sampling unit or sampling frame. Sample households were selected from each KAs sampling frame using simple random sampling method. Without affecting the randomness, 65 households were selected from a list of households who are permanent residents of the six KAs, where sample of the affected households was selected, as matching control group sample.

In general, the study had employed three different sampling techniques, namely the stratified random sampling, random sampling, and purposive sampling. Stratified random sampling was used to categorize KAs into High Prevalence Areas (HPAs) and Low Prevalence Areas (LPAs) based on HIV/AIDS prevalence profile compiled by the Woreda HIV/AIDS Control office. Stratified random sampling is inevitable to ensure that both the two major categories are represented in the sample. Although the disadvantages of non-probability sampling methods, like purposive sampling, in terms of statistical precision and generalization are generally recognized (Churchill, 1995, as cited in Gebrehiwot, 2005) [8], it was considered an appropriate method for this study. This is because the most important criterion in selecting a sample is to increase the validity of the collected data (Carmines & Zeller, 1988, as cited in Gebrehiwot, 2005) [8]. Hence, the study has used a purposive sampling, which is most desirable when certain important segments of the target population are intentionally represented in the sample.

Determining size of the sample is the most difficult situation in sampling analysis. As a general rule one can say that the sample must be of an optimum size i.e., it should neither be excessively large nor too small. Kothari (1990) [14] noted that:

“Technically, the sample size should be large enough to give a confidence interval of desired width and as such the size of the sample must be chosen by some logical process before sample is taken from the universe.”

Accordingly, the size of sample for the study was carried out using a formula propose by Kohtari (1999) and keeping in view nature of the universe, type of sampling, availability of finance and time available for completion of the thesis, among many others.

Method of Data Analysis

Descriptive Analysis

Impact of the pandemic on financial capital, physical capital and food security, which food consumption score was used as a proxy, of sample respondents of both group have been analyzed using a descriptive data analysis method. In the descriptive analysis of this study statistical measures of central tendency and percentage were used to summarize the socio-economic and demographic characteristics of respondents. Moreover, charts and graphs were used for further elaboration of some categorical data. The following three tests were also conducted to select the appropriate test and examine the significance of hypothesized variables.

- i) Continuous data were checked for normal distribution to decide whether parametric or non-parametric test is appropriate for the significance test of result in hypothesized variables.
- ii) Independent sample t-test was used to test significance of the mean values for normally distributed continuous variables that have been hypothesized to discriminate or differentiate between the HIV/AIDS affected and non-affected households.
- iii) To analyze significance of discrete variables, the Chi-Square was used to determine the capacity of discrete variables in differentiating between the HIV/AIDS affected and non-affected households.

Food consumption Score (FCS) Calculation

In order to look at the severity of the impact of HIV/AIDS on household food security, the study has considered, in addition to the investigation of the impact of the pandemic on the various dimensions of food security by using the SLF developed by DFID (1999) [5], some food security proxy indicators, such as FCS.

The FCS is a composite score based on dietary diversity, food consumption frequencies, and relative nutritional importance of different food groups WFP (Alemtsehai & Tsegazeab, 2008) [1]. This score was calculated using information on dietary diversity (the different food items consumed by household members) and the frequencies of consumption. In this study, a composite score of the dietary diversity and food frequency were calculated for affected households and the comparative group. According to WFP (2008), items consumed by households are grouped into food groups (staples, pulses, vegetables, fruit, meat and fish, sugar, milk, oil). These different food groups are given weights, animal proteins with the highest weight. Thus, the consumption score was calculated by summing all consumption frequencies of food items from the same group; the sum of values, after recoded, was multiplied by the respective weight for the food group. The weighted food group scores were summed, which gives the food consumption score (FCS). These scores were regrouped into categories using thresholds, <14 as very poor consumption, 14-21 poor consumption and > 21 as good consumption.

For the purpose of computing the consumption score, households were asked to recall the type of food items their members ate over the seven days period prior to the survey

as well as to indicate the number of days the food type was consumed. A questionnaire was prepared for the survey by adopting the one which was used by Alemtsehai and Tsegazeab (2008) [1], Sarah (2004) [25], and Maxwell *et al.* (2003) [19].

Econometric Analysis

To Measure the impacts of HIV/AIDS on household's food security Logistic regression econometric model was employed in this study. Binary choice models such as linear probability (LPM), logit and Probit are the most widely used models in empirical studies (Gujarati, 2004) [11]. Although logit and Probit yield similar parameter estimates, a logistic regression model is preferred because of its comparative mathematical simplicity (Gujarati, 2004; Greene, 2002) [11, 10]. Thus, for this study, since the dependent variable is dichotomous (i.e., binary, or 0 and 1), we applied logistic regression (logit regression) model to estimate the nature and strength of association between various socio-economic and demographic factors and dietary diversity score (DDS). The parameters of the model were estimated using the iterative Maximum Likelihood Estimation (MLE) procedure due to the nonlinearity of the logistic regression model. The MLE procedure yields unbiased, asymptotically efficient, and normally distributed regression coefficients (Wooldridge J., 1999) [31].

Estimation Technique and Testing Procedure

The parameters of the logistic regression model are estimated using the iterative maximum likelihood estimation (MLE) procedure. Different goodness-of-fit measures show how good the estimated logistic model is. The log likelihood ratio test indicates that the explanatory power of the independent variables taken together was highly significant at less than 1% probability level. This indicates that the hypothesis that all the coefficients except the intercept are equal to zero is rejected. The Chi-square value of Hosmers - Lemshow test shows the goodness-of-fit of the model at less than 1% probability level. Furthermore, the likelihood ratio index indicates that the logit model explains approximately 25% of the total variation in the dependent variable.

Chapter Four

Result and Discussion

Descriptive Statistics Result Analysis

Impact of HIV/AIDS on Physical Capital

Finding of descriptive analysis on the effect of HIV/AIDS on size of land holding for both HIV/AIDS affected and non-affected household shows that the average size of land held by HIV/AIDS affected households was about 0.655 hectares (nearly 17% less) as compared to 0.788 hectares for the non affected ones; it is a statistically significant difference less than 5% level of significance. This result implies that HIV/AIDS has a significant negative impact on the ability of affected households to hold same size of land as non affected ones. Finding of this study regarding to the difference in size of land is consistent with the finding from a study by Alemtsehai and Tsegazeab (2008) [1].

Households were asked to mention the number of different livestock they currently own, the information of which has been converted into Tropical Livestock Unit (TLU). Result of the study shows that the non HIV/AIDS affected households hold a TLU equal to 2.93 while the affected ones were found holding of only 0.384, which is less than

2,547 animals as measured by TLU. This finding suggests that there exists a very big difference in livestock ownership between the HIV/AIDS affected and non-affected households, which was statistically significant at 1% level of significance, implying that HIV/AIDS has affected livestock ownership in households that are affected by HIV/AIDS. And this result is also consistent with the finding from a study by Alemtsehai & Tsegazeab (2008) [1].

Impact of HIV/AIDS on Financial Capital

Income is one of the main pathways through which HIV/AIDS impacts on food security in the rural households. As the major bread winner of the household becomes ill and becomes unable to work for longer period of time, the ability of a household to generate income from major and supplementary sources will be lost. It is firmly believed that HIV/AIDS could potentially affect the acquisition and capability of access to food by rural household by narrowing down to fewer options or totally removing the vital source of their income.

The result on the impact of HIV/AIDS on annual farm income indicates that the average farm income for HIV/AIDS non affected households was higher as compared to the affected ones. The average annual farm income of the HIV/AIDS non affected households was about birr 3,550 whilst the corresponding figure for HIV/AIDS affected households was only birr 1,781, nearly 50% less as compared to the former. The result further indicates that there is also a difference in the average annual farm income between MHH and FHH in both the affected and non affected households. Within the HIV/AIDS affected households, the average annual farm income was birr 2,306 for the MHHs and birr 1460 for FHHs. The corresponding figures for the non affected households, MHH earn an average income of birr 4, 275 whilst for FHH it was birr 2,622. The result implies that HIV/AIDS impacts negatively and reduces the ability and opportunity of the affected households to generate income from agriculture, which is the main source of income for the rural households. This finding is statistically significant at 1% level of significance. Finding of this study is consistent with findings from Sumalea *et al* (2000) [26] and Alemtsehai & Tsegazeab (2008) [1].

Access to loan is one of the main channels through which a household can finance its monetary deficit. Generally, demand for loan arises from three major motives (Varian, 1992). Filling the expenditure gap on consumption might be the first motive to borrow money by the households. The second motive could be a desire to invest i.e. for the purchase of agricultural equipments and farm inputs. The third motive could be for financing the unexpected or to cope with the household contingency plan. Result of the study showed, 43.1 percents of households from the HIV/AIDS affected ones and 49.2 percent from the non-affected households had access to loan.

The chi-square statistic on access to loan showed that it was not statistically significant at 10% level of significance. This shows that HIV/AIDS did not exhibit a visible impact on access to institutional loan on the HIV/AIDS affected households. This result is probably attributable to a non discriminatory loan offer by formal institutions including such institutions as ACSI regardless of the HIV/AIDS status of loan seeking households in the study area.

Crop production is one of the pathways through which HIV/AIDS can affect the food security of rural households through severe illness and death. The average annual crop production for the HIV/AIDS affected households was about 160.67 Kg less than for the non-affected ones. The mean annual crop produced by HIV/AIDS affected is only 272.41 Kg (nearly 38% less) compared to 438.08 Kg by the non-affected. The result is statistically significant at 1% level of significance and it implies HIV/AIDS has negatively affected the ability of HIV/AIDS affected households to produce food for consumption which might be attributed to loss of active labor via morbidity and mortality in a household. The finding is consistent with the findings from the Botswana (Kutlwano, 2005) [15] and Swaziland (Reneth & Mano (2006) [24] studies.

When the results are further broken down by sex of household head, HIV/AIDS has pronounced a significant impact on female headed household's capacity to produce food for consumption. The average crop produced by FHHs (254.17 Kg) is significantly lower (nearly 16% less) than the average produced by their MHH counterparts (302.27 Kg). However, the average annual crop production for female headed HIV/AIDS non affected households (489.42 Kg) was higher (nearly 20% higher) than the average produced by their MHH counterparts (395.08).

Impact of HIV/AIDS on Food Security

To examine the impact of HIV/AIDS on affected household's food security FCS was computed using data collected from the household survey. FCS is a composite food frequency and dietary diversity score that has been developed by WFP to assess the level of food security.

The result on the impact of HIV/AIDS on food security indicates a significant difference at 1% probability level in food security between HIV/AIDS affected and non-affected households. Out of the total number of HIV/AIDS affected households (n=65) none were found in the range of good FCS positions compared to 26 households (38.8%) from the non-affected group who fell within this category. Almost all (n=54, 83.1 %) HIV/AIDS affected households were within the category of poor and borderline FCS, with 27 households in each category whilst the corresponding figure for the non-affected households was only 10 households, 3 in the poor and 7 in borderline. Furthermore, about 11 households (17%) from the HIV/AIDS affected group were found to be in the very poor category while there is no household was found in this category from the non-affected. Based on these findings, it is clear that HIV/AIDS has a negative and significant influence on food security of affected households. This finding is consistent with the one found by WFP (Alemtsehai & Tsegazeab, 2008) [1].

Econometric Model Result Analysis

To provide convincing evidence on the significance of HIV/AIDS proxy variables in explaining the impact of HIV/AIDS on annual farm income of affected households, one has to resort to econometric analysis. Hence, we employed binary logit regression analysis to estimate the impact of HIV/AIDS pandemic on Dietary Diversity Score (DDS) of the affected households.

To identify the independent variables that have influence on household's food security, a binary logit model was estimated using enter-method of MLE procedure. Six continuous and six dummy explanatory variables were used

in the estimation of the logistic model. All the variables were entered in a single step and the estimation process took six iterations.

The logistic regression result indicates that out of the twelve explanatory variables assumed to influence food consumption score of sampled HIV/AIDS affected households. HIV/AIDS status and marital status of the household head were found to have a significant negative impact at explaining variation in DDS of HIV/AIDS affected households. Access to land (A2L) and Sex of the household head (Shh) has positive and significant effect in explaining variation in DDS. The effects of the model estimates were interpreted in relation to the significant explanatory variables in the model as follows:

HIV/AIDS Status: Result of the logistic regression regarding the impact of HIV/AIDS on DDS substantiates findings of the descriptive statistics. As expected, HIV/AIDS status has a negative and significant influence at less than 5% probability level on DDS of HIV/AIDS affected households in the study area. The odds-ratio in favor of falling into ‘better’ DDS, other factors kept constant, decreases by a factor of 0.145 as a household being affected by HIV/AIDS. In other words, households affected by HIV/AIDS have a likelihood of 85.5 percent lower than the non-affected ones in terms of falling into “better” dietary diversity category.

Sex of the household head (Shh): Male headed households have higher likelihood of having “better” dietary diversity (odds-ratio of 5.89) compared to Female headed households. Male headed HIV/AIDS affected households are more likely than their female headed counterparts with respect to falling into “better” dietary diversity score.

Marital Status of the household head (MShh): The model result reveals that Widowed HIV/AIDS affected household heads were found to be less likely than married household heads in terms of falling into “better” DDS and this is statistically significant at a probability less than 5% level. The odds ratio in favor of falling into “better” DDS, other factors remaining constant, decreases by a factor of 0.151 as household heads are being widowed.

Access to Land (A2L): Access to land for cultivation has a positive and statistically significant influence at less than 10% probability level on DDS on HIV/AIDS affected households in the study area. The odds-ratio of access to land for cultivation (31.03) shows that those HIV/AIDS affected households who have access to land are highly likely to fall into “better” DDS as compared to those who had not access to land for cultivation.

Although quantity of food obtained from own production (FACS4), purchase (FACS3) and free food assistance (FACS1) were found to have a positive influence on DDS with higher odds-ratio of 1.011, 1.016 and 1.011 respectively as expected, they are not statistically significant. Similarly, health related expenditure (HExp) was found to have higher negative impact on explaining variations in DDS of HIV/AIDS affected households; the result is not statistically significant at 10% probability level. Moreover, level of education of the household head was found to have no significant relationship with DDS of HIV/AIDS affected households.

Chapter Five

Conclusion and Recommendation

Conclusion

Examining the economic impacts of HIV/AIDS on household’s food security through investigating effects on human, physical and financial capital as well as examining food consumption score of the HIV/AIDS affected households were the overall objectives of this study. The findings in the study have agreed with previous studies done elsewhere, but have also failed to prove certain assertions made with regards to the impacts of HIV/AIDS on food security. Looking to the path ways through which HIV/AIDS can affect food security of rural households the study concluded that HIV/AIDS has negatively and significantly affected:

- The ability of HIV/AIDS households to possess land as equal as non affected households;
- Livestock ownership of HIV/AIDS affected household as compared to the non-affected ones;

Generally, the study found that HIV/AIDS epidemic has eroded the physical capital of affected households significantly.

- Income generating capability and opportunity of HIV/AIDS affected households from agricultural as well as non-agricultural activities;

Furthermore, the study has concluded that:

- HIV/AIDS has positively and significantly affected expenditure of affected households with regard to food related items contrary to expectation but at least true in the study are.

With respect to food security, HIV/AIDS epidemic has a negative and significant impact on FCS of affected households in the study area. HIV/AIDS affected households are vulnerable to food insecurity.

To sum up, findings of the study indicate that HIV/AIDS impacts household’s food security through labor and capital shortages, loss of knowledge and skills, loss of farm implements, loss of access to production assets such as land. The overall effects of HIV/AIDS impacts are reduced rural household’s agricultural production, reduced income, and reduction in household assets, causing reduced access of households to food.

Recommendations

HIV/AIDS was not given a due consideration as a factor which affects food production and food security in rural households. Any development approach that ignores the effects of HIV/AIDS is unfavorable. Thus, efforts should come up with wholistic approaches to food security that integrates all the different factors affecting agricultural production and food security.

This study highlighted that HIV/AIDS is depleting the main livelihood assets of rural households (human capital, physical capital such as land, livestock and financial capital) and thereby reducing their food security. Thus, in order to mitigate the impact of the pandemic location and extent specific intervention programmes aiming at addressing the core impacts faced by HIV/AIDS affected households should be designed.

- In order to address labor shortage faced by households, appropriate labor saving technologies, such as improved

seed varieties that require less labor for weeding, techniques that require minimum tillage, better access to tap water, farming equipments such as light ploughs that can be used by women and youth, intercropping, small agricultural mechanization and low input agriculture, vegetable garden according local needs, cultural practices and emerging gender roles, aimed at improving agricultural productivity and production should be introduced by government as well as donors who are working in the area;

- Free exchange of labor during farming season among households affected by an HIV/AIDS related illness and/or death in the same community should also be encouraged to replace lost labor. HIV/AIDS affected households associations can take this responsibility since it might relatively be easy for them;
- To maintain the economic viability of rural households in general and affected households in particular formal and informal rural institutions and service providers need to be supported so that they are better able to assist households to cope with the impact of HIV/AIDS on financial capital and thus community and household coping mechanism will be strengthened. Such as, Microfinance institutions and Self-help group which provide credit with no interest. NGOs working on mitigating the impact of the pandemic, GOs such as HIV/AIDS prevention and control offices and other concerning institutions may take this as their main programme;
- Direct food and/cash support and/or more flexible credit for income generating activities will be appropriate in order to support households who deplete their assets to buy food, medicine or pay funeral cost;
- Identifying gender roles and inequalities that exacerbate the impact of HIV/AIDS, mainstreaming gender considerations in the design and implementation of all mitigation strategies is required for the basic reason that Female headed HIV/AIDS affected households was found to burden higher impact than their male headed counterparts;
- It is also recommendation of this study that undertaking further study in order to investigate severity of the impact of HIV/AIDS on affected households is crucial. Without which designing intervention programs to mitigate impact of the pandemic may not address the situation.

Identifying extent of the impact of HIV/AIDS should not be the end but the means to address the effects of HIV/AIDS on rural household's food security. The cost of observing today and acting is worse than not observing the situation and in acting to achieve sustainable development.

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