QUANTIFYING LINKAGES OF HIV AND AIDS, FOOD PRODUCTION AND POVERTY IN MALAWI: A CASE OF MZIMBA AND LILONGWE DISTRICTS

BY

MATHINDA BANDA

(BSc. AGRIC. ECON, MW)

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DEPARTMENT OF AGRICULTURAL AND APPLIED ECONOMICS

P.O BOX 219

LILONGWE

MALAWI

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DECLARATION

I hereby declare that this thesis is my own work and effort and that it has not been submitted anywhere for any award. Where other sources of information have been used, they have been acknowledged.

Signature _____

MATHINDA BANDA

Date _____

CERTIFICATE OF APPROVAL

We hereby declare that this thesis is from the student's own work and effort and all other sources of information used have been acknowledged. This thesis has been submitted with our approval.

Principle Investigator _____

PROFESSOR ABDI KHALIL EDRISS

Date _____

Supervisor _____

DR. CHARLES MASANGANO

Date _____

Supervisor _____

DR GRACE MALINDI

Date _____

DEDICATION

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LIST OF ACRONYMS AND ABBREVIATIONS

AIDS : Acquired Immuno Deficiency Syndrome

DADO : District Agricultural Development Officer

FAO : Food and Agriculture Organization

FGD : Focus Group Discussion

GDP : Gross Domestic Product

GoM : Government of Malawi

HIV : Human Immuno-deficiency Virus

NAC : National AIDS Commission

NAPHAM : National Association of People Living with HIV and AIDS in Malawi

NGO : Non Governmental Organization

NSO : National Statistical Office

PLWAs : People Living With HIV and AIDS

RUFORUM : Regional Universities Forum

THAO : Tovwirane HIV and AIDS Organisation

UNAIDS : Joint United Nations Programme on AIDS

UNDP : United Nations Development Programme

WFP : World Food Programme

GLOSSARY

Epidemic : is an outbreak of disease that affects a much greater number of people than is usual.

Food security : is access by all people at all times to enough food for an active, healthy life. Its essential elements are the availability of food and the ability to acquire it, (Ellis, 1992).

Head- count Index : is the proportion of the population who live in households with a per capita consumption less than the poverty line (Khandker and Chowdhury, 1996).

Pandemic : is a world wide epidemic

Poverty Gap Index : is the mean distance below the poverty line as a proportion of that line (where the mean is formed over the entire population counting the non-poor as living a zero poverty gap) (Khandker and Chowdhury, 1996).

Prevalence : of a disease is defined as the ratio of the number of cases of a disease present in a population at a specified time and the number of individuals in the population at that specified time.

Production function : is a technological relationship between the quantity of a good produced and the quantity of inputs which are required to produce it, (Todaro, 1994).

Squared Poverty Gap : is the mean of the squared proportion poverty gap (Khandker and Chowdhury, 1996). It measures severity of poverty.

ABSTRACT

The study was carried out in Lilongwe and Mzimba districts to quantify the linkages of HIV and AIDS to food production, food security and poverty. A total of 370 households (185 affected and 185 non-affected) were interviewed, with 160 households from Mzimba and 210 from Lilongwe district.

The study has established that there is a negative linkage between HIV and AIDS, food production, food security and poverty. In HIV affected households, physical factors allocated to maize production are less than those in non-affected households. Affected households allocated 19.8% less land, 15.3% less labour and 24.1% less fertilizer to maize production due to chronic illness. This results to significantly ($P<0.01$) low food production, about 38% lower, in affected households compared to the non-affected households. The most determining factor is the labour. When labour is not enough, a household is forced to allocate less land to production. Coupled by lack of inputs, especially fertilizer, a household is likely to produce less maize. HIV and AIDS non-affected households are also better off in terms of food security situations compared to affected households. A significantly ($P<0.01$) higher proportion of non-affected households (31.9%) had food throughout the year compared to affected households (11.9%).

The study has also established that poverty is more pronounced in HIV affected households than in the non-affected households although both household categories are poor. There are significantly ($P<0.05$) more people, about 95.9%, below the poverty line in affected households than in non-affected households, where 90.6% are below the poverty line.

The study recommends establishment and enforcement of labour saving technologies especially in HIV and AIDS affected households so that the affected households can be able to meet their food requirements with the little available labour. It also recommends empowering the affected households economically through the AIDS support groups to which they belong in order to reduce the levels of poverty prevailing among them.

CHAPTER 1

INTRODUCTION

1.0 Background

Agriculture is the most important sector of the Malawi economy. Agriculture in Malawi accounts for about 39 percent of Gross Domestic Product (GDP), and employs some 85 percent of the workforce. It contributes to more than 90 percent of the country's foreign exchange earnings (Food and Agriculture Organisation, World Food Programme, 2005). Agriculture is a source of income, food and livelihoods for the majority of Malawians. Eighty six percent of the Malawi population lives in the rural areas and is engaged in Agriculture (World Bank, 2000b). However, agricultural production is under a big threat with the HIV and AIDS pandemic, which is spreading at an alarming rate in Malawi. Majority of Malawians rely on Maize as a major food crop. Ng'ong'ola *et. al*. (1997) reported that the bulk of maize producers in Malawi are the smallholder farmers and that unlike estates, a lot of smallholders grow maize for home consumption.

Like all other sectors in the economy, the agriculture sector has been affected adversely by the HIV and AIDS epidemic. National AIDS Commission (NAC) report (2003) indicated that AIDS has adverse effects on agriculture, including loss of labour supply. Agriculture in Malawi demands a lot of intensive labour force. HIV and AIDS are posing a big threat to the labour force hence to food production, availability, accessibility and stability among smallholder farmers in Malawi. Stokes (2003) reported that the HIV and AIDS epidemic has been demonstrated to have far reaching effects across all sectors of society, but particularly on labour-intensive sectors such as agriculture.

Malawi's first reported AIDS case occurred in 1985. In response, the Government implemented a short-term HIV strategy (including blood screening and HIV education programmes), and created the National AIDS Control Programme (NACP) in 1988 to co-ordinate the country's HIV education and prevention efforts (Pembrey, 2006).

There has been a rapid increase in the number of adults and children infected with and dying from HIV and AIDS from the time it was first identified in the mid 1980s. Nearly 34 million people in the world are currently living with HIV and AIDS, one third of whom are young people between the ages of 10 and 24. The epidemic continues to strike with over 16,000 people worldwide becoming newly infected each day (World Bank, 2000a). The prevalence of HIV and AIDS in Malawi is very high compared to other countries of the sub-Saharan region in Africa. Yearly HIV and AIDS infection has progressively increased from 17 in 1985 to 51,999 persons in 1998 (Joint United Nations Programme on AIDS-UNAIDS, 1999). Sixteen percent of adults (15-49 years) were living with HIV and AIDS by the end of 1999 (Haddad and Gillespie, 2001). Currently according to UNAIDS report (2006), 14.1 percent of adults between the ages of 15-49 years are living with HIV and AIDS in Malawi.

1.1 Problem Statement and Justification

Agricultural production especially food production has declined over the years with the emergence of HIV and AIDS in Malawi. Pembrey (2006) reported that the AIDS crisis is one of a multitude of problems currently faced by Malawi, alongside poverty, food insecurity and other diseases such as malaria.

The agricultural sector has been adversely affected due to HIV and AIDS. The epidemic reduces the farm labour supply, which is essential for agricultural production. The supply of labour is reduced due to morbidity as the productive members in a household are infected by HIV and AIDS. When a member of a household is sick, family members will divert their time from farming activities to caring for the sick, thereby reducing the amount of labour supplied to the farm. Death due to HIV and AIDS will also reduce the amount of labour, which is supplied in a household. Haddad & Gillespie (2001) reported that the impacts of HIV and AIDS on agriculture and resource management revolve around how to deal with labour and knowledge losses and institutional weakening. As labour becomes depleted, new cultivation technologies and varieties need to be developed that do not rely so much on labour. The reduced supply of labour will cause much of the land owned by the household to remain furrow. This will also cause a drop in production.

The epidemic also affects capital. Morbidity and mortality will cause diversion of income from the purchase of inputs for agricultural production to medical and funeral expenses, respectively. Ncube (1999) indicated that land may remain uncultivated because of several reasons; labour shortage due to the deaths of family members and shortage of agricultural inputs due to the death of an income earner.

Agriculture is a source of income, food and livelihoods for the majority of Malawians (Malindi, 2005). HIV and AIDS pandemic will deprive people of their food, income and livelihoods due to the devastating effects it has on agriculture, thereby deepening the poverty levels.

In Malawi, no study has been done to establish the link between HIV and AIDS, agricultural production, and poverty using econometric methods. A lot of research has been carried out on the medical and clinical aspect about HIV and AIDS in Malawi. There is also an increasing body of work on the impact of the disease on social and economic systems, but very little is understood about how HIV and AIDS affect the factors of production which in turn lead to a decline in agricultural production, food insecurity, low incomes and poverty. This research, therefore, aimed to qualitatively and quantitatively demonstrate how HIV and AIDS are affecting food production, food security, income and poverty levels.

1.2 Research Questions

- How do HIV and AIDS affect food production?
- What are the impact of HIV and AIDS on farm labour and other factors of production?
- What are the differences between HIV and AIDS affected and non-affected households with respect to food security, what is the impact of HIV and AIDS on food availability, accessibility and stability at household level?
- Are there differences between HIV and AIDS affected and non-affected households in terms of income and poverty levels?

1.3 Objectives

1.3.1 General Objective

To analyze the linkages between HIV and AIDS, food production, food security and poverty

1.3.2 Specific Objectives

- To analyze the impact of HIV and AIDS on food production
- To analyze food security situations among HIV and AIDS affected and non-affected households
- To quantify the impact of HIV and AIDS on physical factors of production (land, labour and capital)
- To assess differences in income and poverty levels between HIV and AIDS affected and non-affected households

1.4 Hypotheses

The study aimed to test the following hypotheses:

- HIV and AIDS have no impact on smallholder household food production.
- HIV and AIDS have no impact on food security (availability, accessibility of food at household level).
- HIV and AIDS have no impact on the physical factors of production
- There are no differences in income and poverty between HIV and AIDS affected and non-affected households

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

In order to understand the effects of HIV and AIDS on agricultural production, food security and poverty, several literatures were reviewed. First the review was on the global, regional and national situation of HIV and AIDS. Secondly, the effects of HIV and AIDS on agricultural production, food security and poverty were also reviewed. It should be noted however, that the review dwells much on government and NGO reports and not on academic peer reviewed journal studies. This is the case because the area of HIV and AIDS has been of much emphasis by the government and NGOs and it is a new area in the academic arena.

2.1 Global and Regional Dimension of HIV and AIDS

Throughout history, few crises have presented such a threat to human health, social and economic progress, as does the HIV and AIDS epidemic (FAO Committee on World Food Security, 2001). Over 36 million individuals are currently living with HIV and AIDS, 95 percent of whom are from developing countries. Sub-Saharan Africa is the region most affected, where HIV and AIDS is now the region's leading cause of adult morbidity and mortality (Haddad and Gillespie, 2001; FAO Committee on World Food Security, 2001).

In the countries of Sub-Saharan Africa that have been hardest hit by HIV and AIDS, life expectancy is lower today than it was 20 years ago. More than one adult in ten is living with HIV and AIDS (Haddad and Gillespie, 2001). HIV and AIDS are also spreading

radically in Asia. India is estimated to have 3 to 5 million HIV infections and up to 10 million HIV infections in China. Asia will overtake Sub-Saharan Africa in absolute numbers before 2010 and by 2020; Asia will be the HIV and AIDS epicenter. India with over four million people infected has the largest population living with HIV, but regionally the magnitude of the epidemic is greatest in sub-Saharan Africa where more than 24 million people are infected with the virus (FAO Committee on World Food Security, 2001).

FAO committee on World Food Security (2001) reported that the global HIV and AIDS epidemic will have widespread adverse effects on social and economic development for years to come. HIV and AIDS can no longer be considered solely as a health problem; efforts are needed to address its social, economic and institutional consequences. Increasingly, the HIV and AIDS epidemic is having a major impact on nutrition, food security, agricultural production and rural societies in many countries. The committee further reported that the prevalence of the disease is still increasing. Since the disease commonly strikes the most economically productive members of society, HIV and AIDS is a problem of critical importance for agricultural, economic and social development.

2.2 Situation of HIV and AIDS in Malawi

Garbus (2003) reported that Malawi is one of the world's poorest countries. HIV and AIDS have undermined the country’s efforts to reduce poverty and the epidemic is now itself an important part of structural poverty in Malawi. In 2002, life expectancy in Malawi was 38.5 years, whereas it would have been 56.3 in a "non-AIDS" scenario. By 2010, life expectancy is projected to fall to 36.9. The report further stated that in the medium term,

Malawi would experience a 4.8 percent reduction in GDP per capita because of HIV and AIDS. Much of this decrease is the result of lost knowledge and skills due to AIDS mortality within the workforce. HIV and AIDS-related conditions currently account for over 40 percent of all inpatient admissions.

According to UNAIDS report (2006), by the end of 2005, 940000 people were living with HIV and AIDS in Malawi, 14.1 percent of adults were living with HIV and AIDS, 500000 women (ages 15-49) were living with HIV and AIDS, 91000 children (ages 0-15) were living with HIV and AIDS. The report further stated that the estimated number of deaths due to HIV and AIDS during 2005 was 78, 000.

2.3 HIV and AIDS and Agricultural Production

Agriculture is the largest economic sector in Malawi accounting for a large portion of production and a majority of employment. National AIDS Commission report (2004) indicated that AIDS has adverse effects on agriculture, including loss of labour supply and remittance income. The loss of few workers at the crucial periods of planting and harvesting can significantly reduce the size of harvests. The report further stated that the loss of agricultural labour is likely to cause farmers to switch to less labour- intensive crops. In many cases this may mean switching from export to food crops. Thus AIDS could affect the production of cash crops and, as a result, affect foreign exchange earnings. Production may also suffer as the timing of general agricultural tasks is disrupted as workers fall ill and as others need to take care for them.

According to Mataya *et. al.* (1998), one of the major factors which limit the realization of full country's agricultural potential is inadequacy of labour supply during peak growing periods coupled with lack of appropriate tillage and harvesting technology. Inadequate labour supply due to HIV and AIDS will limit agricultural and food productivity, which will in turn affect food availability, accessibility, and stability. Malawi Government and United Nations Development Programme report (2002) indicated that families which depend on small-scale and crop farming as a livelihood strategy are devastated by HIV and AIDS related illness and death. For households with AIDS patients, production will decline as farmers and those looking after the patients spend less time tending the crops. Income will be lost from unsold or incompletely tended cash crops and families will be forced to buy food which they normally produce themselves. They may even have to sell off farm equipment or household goods to survive. The vicious circle is compounded by the increase in health care costs.

De Waal and Tumushabe (2003) reported that loss of household labour (quality and quantity) is the key factor that impacts production. It includes the following:

- The illness of productive members of the household, especially women, leads to a double loss. The productive individual works less, and there is also a need to care for that sick individual. Studies indicate that households with sick individuals spend far less time on agricultural activities than others, leading to neglecting of fields, decrease in planted area, and switch to less labour-demanding crops.
- The death of an adult is often disastrous; it leads to declines in production and income.

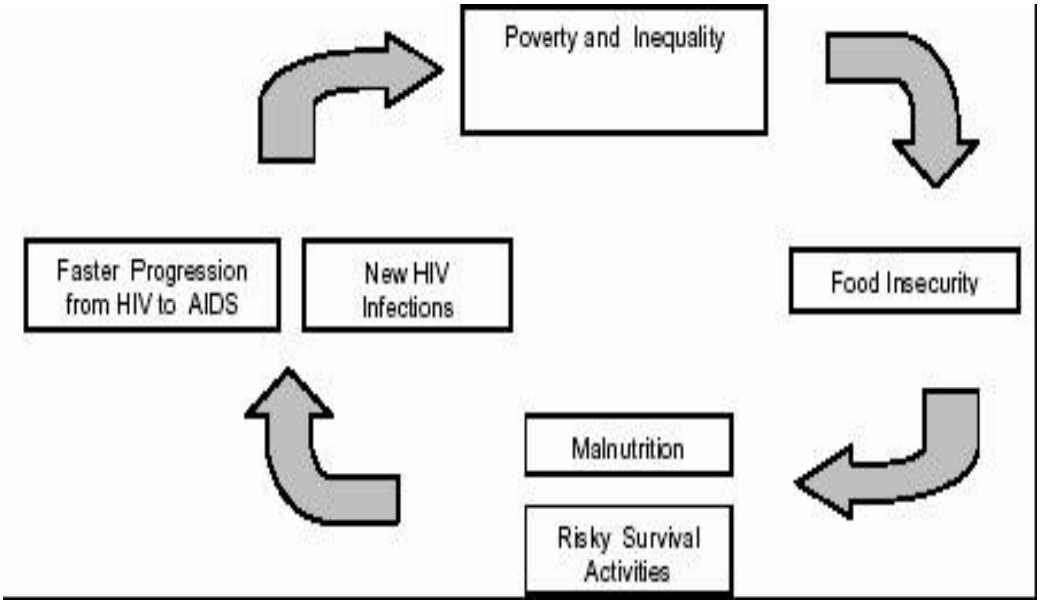
- There is a diversion of labour from productive activities to funerals. The cost of funerals often impoverishes households, especially when the slaughter of livestock is required.
- The death of an adult from HIV and AIDS is usually more disastrous than if it is from other causes. This is almost certainly because of the protracted nature of AIDS and the high labour costs and other expenditures associated with care and treatment. One of the few studies of the impact of AIDS on rural production comes from a communal area in Zimbabwe. The study showed that death of an adult resulted in 45% decline in the quantity of maize marketed by a household. But when the cause of death was identified as AIDS the decline in quantity of maize marketed was 61%.
- The psychological impact of the illness and death of an individual commonly leads to depression and lack of motivation to work hard among other family members.
- Declining health of other family members. Children and adults in AIDS-afflicted households are less well nourished, more likely to be sick, and more likely to die from all causes. Evidence from eastern and southern Africa shows that households affected by HIV and AIDS eat fewer meals and consume poor foods. They also invest less in the health of surviving members. This leads to loss of labour due to frequent morbidity.

2.4 HIV and AIDS and Food Security

The FAO committee on World Food Security (2001) indicated that all dimensions of food security (availability, stability, access and use of food) are affected where the prevalence of HIV and AIDS is high.

HIV and AIDS contribute to food crisis and in turn the food crisis fuels the AIDS pandemic. Conroy (2003) reported that smallholder agriculture in Malawi depends critically on labour. AIDS affects agriculture because the farm labour force is made up principally of sexually active adult men and women. AIDS exacerbates an already serious labour constraint, reducing labour availability and productivity. Women face the "double burden of care" as they are more likely to be infected with HIV and AIDS and are also responsible for most of the agricultural labour and for caring for the chronically sick. The report further states that AIDS has an adverse impact on agriculture diverting capital from investment, depleting assets and diverting income to pay for the cost of health care and funerals.

The committee on World Food Security (2003) reported that the linkages between HIV and AIDS and food security are bi-directional: HIV and AIDS is a determining factor of food insecurity as well as a consequence of food and nutrition insecurity. This relationship is shown in Figure 1.



Source: Save the Children and Oxfam: HIV/AIDS and Food Security in Southern Africa, December 2002.

Figure 1: Relationship between HIV/AIDS and Food Security

Food insecurity and poverty fuel the HIV and AIDS epidemic, as people are driven to adopt risky strategies in order to survive. The break-up of households due to labour migration in times of food insecurity as well as the exchange of sex for money or food during crises increases vulnerability, with women and children particularly exposed. In addition, poverty-induced malnutrition is likely to lead to an earlier onset of AIDS, due to an increased susceptibility to opportunistic infections. Thus, food security interventions, if carried out with an "HIV and AIDS lens" and if complemented with HIV-specific interventions, can contribute to reducing HIV infection.

Conroy (2003) gave a case on how food crisis fuels the AIDS pandemic. The 2001/2002-food crisis fuelled the AIDS pandemic directly through its impact on high-risk sexual

behavior and indirectly through its impact on government finances. During the first six months of the food crisis, there was a significant increase in high-risk sexual behavior. Adult men increased mobility as they sought opportunities for off-farm employment. This increased mobility led to an increase in the number of sexual partners. Women increasingly turned to transactional sex in order to get food to feed the family, and young women were often pressurized into having transactional sex or forced into prostitution or early marriage.

2.5 HIV and AIDS and Poverty

According to National Statistical Office-NSO (2006), 52.4 percent of the population in Malawi is poor. The poverty line in Malawi Kwacha per person per year is currently at MK 16,165. The southern region has the highest poverty rates (60%) implying that three out of five people live in poverty in the rural areas of the Southern region. The Northern region has the second highest proportion of poor people (54%). The Central region has the lowest proportion of poor people estimated at 44% (NSO, 2005). The HIV and AIDS pandemic has devastating impacts at various levels, from the individual and household level to communities and society as a whole, including political and administrative systems. Malawi Government and UNDP (2002) reported that this is particularly the case because the epidemic disproportionately affects young adults, who are central to economy and fulfill important functions as workers, breadwinners, parents, educators, and health care providers.

There is a clear link between HIV and AIDS and poverty. Poverty is one of the major underlying factors driving the epidemic and just as poverty deepens the HIV epidemic, the

epidemic also deepens poverty in a serious vicious cycle (Malawi Government & UNDP, 2002).

The economic effects of HIV and AIDS are felt, first by individuals and their families. NAC report (2004) indicated that the household impacts begin as soon as a member of the household starts to suffer from HIV related illnesses. Illness prevents the primary breadwinner from working, increases the amount of money the household spends on health care, and requires other household members to miss school or work in order to care for the patient. Death of the patient results in a permanent loss of income, either through lost wages and remittances, or through a decrease in agricultural labour supply. Households must also bear the costs of funerals and mourning, which in some settings are substantial. When children are withdrawn from school in order to save on educational expenses and increase the labour supply, the household suffers a severe loss of future earning potential.

CHAPTER 3

METHODOLOGY

3.0 Introduction

This chapter describes the methodology used in the study from data collection to analysis. It starts with data collection techniques and instruments used in data collection. It also looks at sample size calculation and sampling techniques. The chapter further presents the conceptual framework. Lastly there is a description of the analytical technique including descriptive statistics and specification of the modified Cobb-Douglas production function.

3.1 Sampling population and study area

The study population consisted of HIV and AIDS affected and non-affected households in the Northern and Central regions of Malawi. The study was carried in Mzimba and Lilongwe districts. These districts were chosen because of the following reasons:

- The districts are active in the main agricultural enterprises such as maize, and tobacco (Ministry of Agriculture, 2000)
- Mzimba and Lilongwe are among the most affected districts in the country. NAC report (2005) revealed that HIV and AIDS prevalence in Mzimba and Lilongwe was 14.4% and 18.6% respectively.
- The districts have well established support groups for People Living with HIV and AIDS (PLWAs). National Association of People living with HIV and AIDS in Malawi – NAPHAM in Lilongwe and Tovwirane HIV and AIDS organisation in Mzimba

3.2 Data collection techniques and instruments

3.2.1 Survey Instruments

Cross sectional data were collected and used in the study. The data were collected using the following instruments:

1. **Questionnaires**- Structured questionnaires were used to collect primary data through interviews with randomly selected rural farming households. A questionnaire was administered to the household head, above 15 years of age at the time of the survey.
2. **Checklists**-these were used to collect data from the community through focus group discussions, and also from key informants.

3.2.2 Data Collection techniques

1. Personal interviews with selected rural farming HIV and AIDS affected and non-affected households.
2. Participatory Appraisal Methods (PRA) – the method was used to collect additional data (qualitative) from key informants and focus group discussions in the villages.
   - Focus Group Discussions (FGD) were conducted in each area where there was an AIDS support group in order to get more information about the community. A guiding checklist for this was used. The focus group discussions were done separately, according to social setting; men, women and youth separately.
   - Key informants interviews were carried out in order to collect more information about the farming community so as to supplement information collected using other methods. The key informants in this situation included: the village headman, the support group coordinators and the District Agricultural

Development Officer (DADO). These key informants were chosen on the assumption that they had knowledge about their communities in terms of HIV and AIDS issues. The support group coordinators gave information on the trend of the epidemic in the selected areas, while the DADO gave more insight on agricultural production in the face of HIV and AIDS.

3.3 Sample Frame

The sampling frame for the research was as follows:

I. HIV and AIDS affected and non-affected households in Northern and Central Malawi.
II. Mzimba and Lilongwe Districts in the Northern and Central region of Malawi respectively.
III. A total of seventeen AIDS support groups & seventeen villages (11 of each from Mzimba and 6 of each from Lilongwe) purposively sampled based on location.
IV. A total of 370 households randomly selected, 185 affected and 185 non-affected, within the support groups, and selected villages respectively.

3.4 Sample size

A sample of 370 households (185 HIV and AIDS affected and 185 HIV and AIDS non-affected households) was randomly selected from the two districts. The names of HIV and AIDS affected households were drawn with the help of Tovwirane HIV and AIDS organisation, Mzimba District AIDS Coordinator and National Association of People Living with HIV and AIDS in Malawi (NAPHAM).

Edriss (2003) reported that to calculate the sample size, n, needed to estimate a population proportion, p, the following formula is used: $n = [Z^2 (1-p) p] / e^2$. Where n is the desired sample size, Z is the z-value yielding the desired degree of confidence, p is an estimate of the population proportion, and e is the size of the error in estimating p that the researcher is willing to permit.

According to UNAIDS (2006) report, 14.1 % of the adult population (15-49) are living with HIV and AIDS in Malawi. This proportion is what was to be estimated and was essential for the calculation of the sample size that was to be used in the study. Hence, for 95% (Z = 1.96, 2- tailed test) level of confidence, within ± 5% (e= 0.05) margin of error and taking into account the proportion of HIV and AIDS prevalence in Malawi, the sample size was determined as

$$\mathbf{n = [Z^2 (1-p) p] / e^2 = [1.96^2 (1-0.141) 0.141]/0.05^2 = 186.12 = 186}$$

Adding 5% non-respondents the sample size was n = 195 for each household category. Thus, interviewing a total of 390 (with equal sample size of 195 affected and 195 non-affected households) respondents was essential to provide the bulk of the information that was required. However, due to some logistic and non-respondents problems, only 370 households were interviewed (185 affected and 185 non-affected households)

The sample was split between the two districts taking into consideration the districts' HIV and AIDS prevalence rates in the ratio of 14.4 to 18.6 for Mzimba and Lilongwe respectively. The total sample for Mzimba was 170, but only 160 were interviewed and for Lilongwe the sample was 220, but only 210 were interviewed. Thus the study used a total of 370 respondents.

The households, in this study, were grouped in two strata and classified as follows:

1. Affected household:

Household in which the household head (above 15 years of age), spouse or both are living with HIV and AIDS at the time of the survey

2. Non-affected household:

Households where neither household head nor spouse is living with HIV and AIDS at the time of the survey

Both male-headed and female-headed households were included in the study

3.5 Sampling Techniques

Household head selection

A multi-stage stratified sampling procedure, involving a combination of purposeful, proportionate, stratified and simple random sampling procedure was used to draw the sample.

AIDS support groups, within the districts, were purposively selected basing on their location. This study targeted support groups in rural areas to capture data on the farm families.

The final stage was to select number of respondents from each support group. The sample was selected proportionate to the population of people living with HIV and AIDS in that support group, and then the respondents were randomly selected. This sample constituted affected households. The non-affected households were randomly selected from the same area where the support group was located. The sample for the non-affected households was

equal to that of the affected households in each support group for easy of comparison of their characteristics.

In Mzimba district, 80 affected and 80 non- affected households were interviewed from 11 AIDS support groups. Equal numbers of affected and non-affected were sampled from each support group.

In Lilongwe district, 105 affected and 105 non- affected households were interviewed from 6 AIDS support groups. Again, equal numbers of affected and non-affected were sampled from each support group.

Hence, a sample of 370 households was obtained and interviewed for the whole study.

3.6 The Conceptual Framework

The study was based on the fact that HIV and AIDS impact negatively on the physical factors of agricultural production (land, labour and capital). HIV and AIDS lead to morbidity and mortality. These would lead to income diversion to medical and funeral expenses hence a reduction in the farm inputs and food purchased. Morbidity would cause labour shortages in a household. The decline in farm inputs coupled with labour shortages would cause a decline in agricultural production which in turn would lead to food shortages and reduced income from agriculture. This process would lead to an unending poverty in a household. This is depicted in Figure 2.

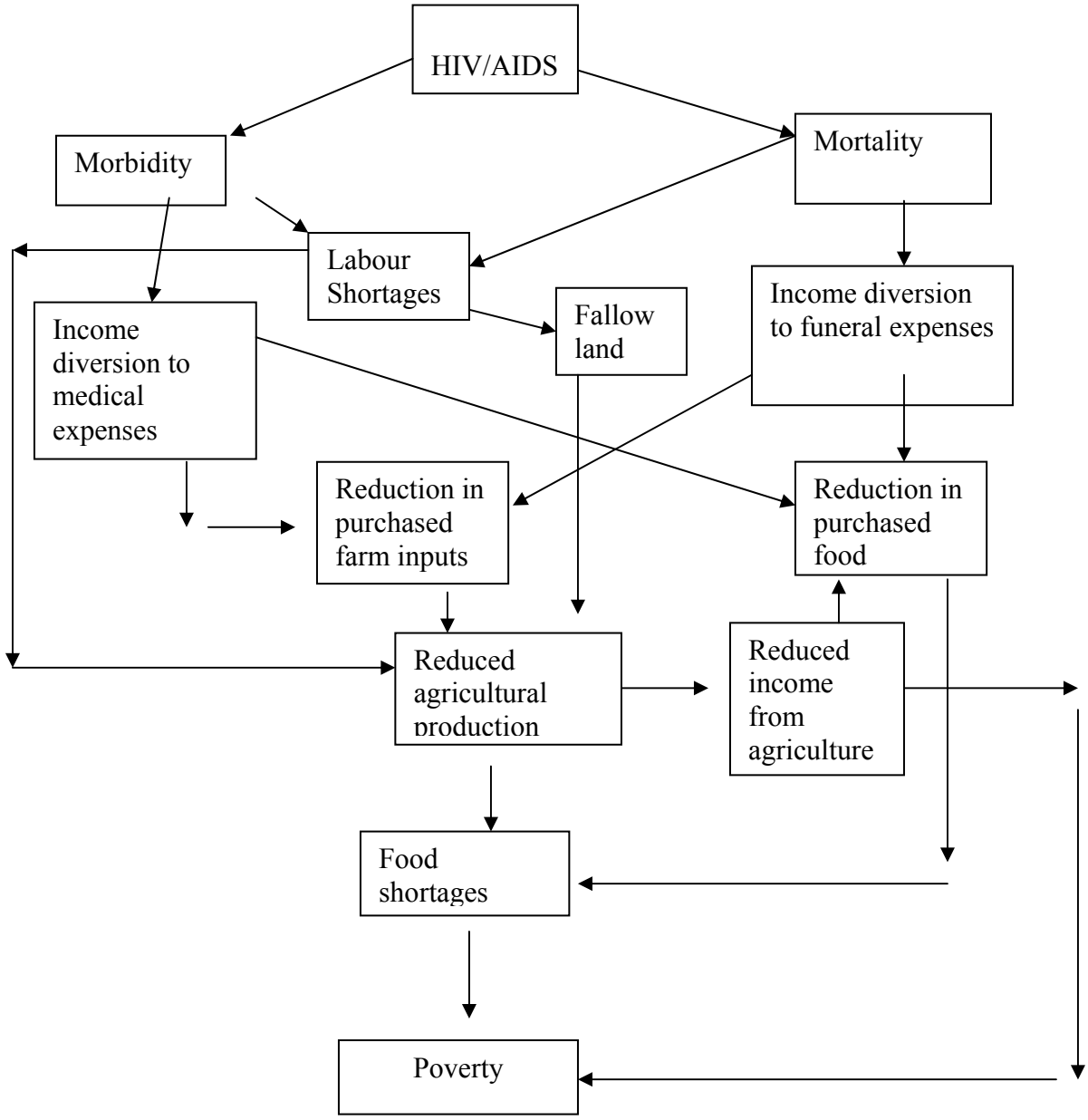


Figure 2: The impact of HIV and AIDS on agricultural production, food security, income and poverty levels.

3.8 Analytical Technique

3.8.1 Descriptive Statistics

Descriptive statistics were used in data analysis. These included; percentages, frequencies, means and poverty indices. These helped in explaining some of the socio-economic characteristics of the sample. These were then tested to see if there were significant differences in socio-economic characteristics between affected and non-affected households. The statistics were also used to test some of the hypotheses in the study, these included; whether HIV and AIDS have no impact on physical factors of production, whether HIV and AIDS have impact on food security and whether there were differences in poverty levels between HIV and AIDS affected and non-affected households. The test statistics used in the study included t-test and the chi-square test.

The measures of poverty were based on the current poverty line for Malawi, which is at MK16, 165 per person per year (NSO, 2005). The measures included headcount index, poverty gap index and poverty gap index squared. These were calculated as follows:

Head Count Index (HI)

This gives the proportion of the total population for whom consumption is less than the poverty line; it measures the prevalence of poverty. Its drawback, however, is that it is insensitive to changes in the depth of poverty (Ellis, 2000). The head count Index was calculated using the following formula: HI = q / n. Where n is the population under study and q is the number of people within the population, below the poverty line.

Poverty Gap Index (PGI)

This was computed as follows; PGI = $1/n \sum [(z-y_i)/z]$. Where z is the poverty line, y is per capita income and n is the population. The index measures the amount of money required to raise the income of a poor person to the level of the poverty line. The aggregate poverty gap involves summing individual poverty gaps across the total number of poor people. This represents the total income transfer that would be needed to raise the incomes of the poor up to the poverty line level. This measure is regarded as a good indicator of the depth of poverty. It also gives yields an indicator of the minimum cost of eliminating poverty using targeted transfers to the poor (Ellis, 2000).

Poverty Gap Index Squared (SPG)

The Squared Poverty Gap uses same variables as the Poverty Gap Index and was calculated as follows; SPG = $1/n \sum [(z-y_i)/z]^2$. Where z is the poverty line, y is the per capita income and n is the population under study. This measure of poverty is considered useful for comparing populations that have differing experiences with respect to the severity of poverty. The poverty gap index fails to capture the severity of poverty. This defect can be overcome by squaring the individual poverty gap ratios before they are summed (Ellis, 2000).

3.8.2 Production Function Analysis

Production function is a technological relationship between the quantity of a good produced and the quantity of inputs required to produce it (Todaro, 1994). There are various types of production functions, which include Cobb-Douglas, translog, and

quadratic production functions among others. To determine the type of production function to be used, the relationship between output and the inputs used in production was estimated and was found to be linear. The linear relationship necessitated the use of Cobb-Douglas production function. The function in its stochastic form may be expressed as

$Y_i = \beta_1 X_{2i}^{\beta 2} X_{3i}^{\beta 3} X_{4i}^{\beta 4} e^{ui}$

Where:

Y_i = Output

X_{2i} = land input

X_{3i} = labour input

X_{4i} = capital input

u = Stochastic disturbance term

e = base of natural logarithm

From the above expression, it is clear that the relationship between the output and the inputs is not linear. However if we log-transform this model, we obtain

$\ln Y_i = \ln\beta_1 + \beta_2 \ln X_{2i} + \beta_3 \ln X_{3i} + \beta_4 \ln X_{4i} + u_i$

$= \beta_0 + \beta_2 \ln X_{2i} + \beta_3 \ln X_{3i} + \beta_4 \ln X_{4i} + u_i$ where $\beta_0 = \ln\beta_1$

Thus written, the model is linear in the parameters β_0, β_2, β_3 and β_4 and is, therefore, a multiple linear regression model (Gujarati, 1995).

3.8.3 Model Specification

The major food crop that was looked at in this study is maize because in Malawi maize is the staple food. Maize production in Malawi is affected by several factors, which include

land, labour, fertilizer use and use of improved varieties. These are the physical factors of maize production in Malawi. Fertilizer and improved seed are proxies for capital. Smale and Phiri (1997) reported that for many years, smallholder farmers have used fertilizer on maize more than they have used improved seed. In this study, therefore, fertilizer was used as a proxy for capital. Apart from the physical factors, there are also other socio-economic factors, which affect food production, these include; education level of the household head, extension visit, income of the household and HIV and AIDS status among others. The effects of these socio-economic factors were also estimated in the study. These factors were included in the production function to come up with the modified Cobb-Douglas (CD) production function.

The modified CD production model combined both the physical and non-physical factors of production as follows:

$$\ln OUTPUT = \beta_0 + \beta_2 \ln LAND + \beta_3 \ln LAB + \beta_4 \ln FERT + \beta_5 EDUCAT + \beta_6 STAT + \beta_7 EXTVISIT + \beta_8 INCOM + u_i$$

Where:

lnOUTPUT = natural log of Maize production in household *j* (Kg)

lnLAND = natural log of land size allocated to maize production in household j (ha)

lnLAB = natural log of amount of labour used for food production in household j (person-hours)

lnFERT= natural log of amount of fertilizer used in maize production in household j (kg)

EDUCAT = Education of household head *j* (number of years in school)

STAT = HIV Status of the household j (0 = non- affected household 1 = HIV and AIDS affected household,)

INCOM = household income (MK)

EXTVISIT = whether a household is in contact with an extension worker (1= yes and 0= no)

β_i = Coefficients to be estimated (i= 0, 2, 3,4,5,6,7,8)

u_i = Error term

3.8.4 Description of Variables

Household Maize Production

Maize production was used as a dependent variable in the study, and was used as a proxy to food production. It was measured in kilograms as a continuous variable. The amount of maize produced in 2005/06 season was captured for both household categories, that is, affected and non-affected in the two districts. Maize production can be affected by a number of factors both physical and socio-economic. These were used as the independent variables to explain the variations in the household maize production.

Amount of Labour used for Farm Production

Labour is essential in any type of production including food production. It was measured as a continuous variable in person-hours. When the amount of labour available in a household is high, it is expected that maize production will also be high because the farm operations will be done effectively. It was difficult to isolate labour used for the maize enterprise, thus the labour used in this study is the total labour for all the crop enterprises available for the

household. The study considered both family and hired labour and the quality was also considered by looking at the number of hours a family spent at the garden. It was assumed that a person living with HIV and AIDS would spend fewer hours in the garden due to morbidity.

Land Allocated to Maize Production

This is also crucial in determining the total maize produced. It is expected that a household which allocates more land to maize production will produce more maize than a household which allocates less land. The land was measured in hectares as a continuous variable.

Amount of Fertilizer used in Maize Production

This was captured as a continuous variable and measured in kilograms. Fertilizer is very essential in maize production. Production increases with fertilizer application.

Education Level of the Household Head

This was measured as the number of years a household head spent in formal education and was captured as a continuous variable. Education is very crucial in agricultural production. When one is educated, he/she is able to follow the recommended cultural practices and also seek extension services where need be. Because of this it is expected that production will be high.

HIV Status of the Household

This was captured as a dummy variable where 0=non-affected household and 1= affected household. It is expected that the affected households will produce less maize than the non-affected households, because they are limited in labour and capital. They also allocate less land to maize production due to labour and capital constraints.

Household Income

This was measured in Malawi Kwacha as a continuous variable. It is expected that when a household has high income levels, it will be able to purchase farm inputs such as fertilizer, seed and sometimes labour if household labour is limited. Thus maize production will increase with increase in household income.

Extension Visit

This was captured as a dummy variable where 1= contact with extension worker and 0= no contact with the extension worker. When a household is in contact with the extension worker, new ideas will be acquired regarding their maize production. Farmers who are frequently in contact with extension workers will realize higher maize production than those who are not.

3.8.5 Limitations of the Study

Although the study demonstrates the negative impact that HIV and AIDS have on food production, security and poverty, it was carried out with some limitations. The major limitation is that the study targeted HIV and AIDS affected households whose members

belonged to a support group only. There are a lot of people in Malawi who are living with HIV and AIDS but are not members of support groups. Such people were not included in the study because it was difficult to identify them considering the sensitive nature of the issue.

Another limitation was that the study was only carried out in two districts out of about 29 districts in the country. This was due to financial and time constraints. The results from this study, therefore, cannot be inferred to the whole country.

CHAPTER 4

RESULTS AND DISCUSSION: DESCRIPTIVE STATISTICS

4.0 Introduction

This chapter gives an assessment of various sample characteristics. These characteristics are then compared between the affected and non-affected households. In the chapter, the results of hypotheses testing, of whether HIV and AIDS have no impact on food security, whether HIV and AIDS have no impact on physical factors of production and whether there are differences in poverty levels between HIV and AIDS affected and non-affected households, are also presented. The test statistics used are chi-square, t-statistic and z-statistic. The chapter starts with the socio-economic characteristics and further gives assessment of the physical factors of production, food security and poverty issues.

4.1 Socio-Economic Characteristics

The socio-economic characteristics considered in the study include sex of household head, marital status, age, education level, size of household and land holding size. These characteristics affect agricultural production and vulnerability to HIV and AIDS effects.

4.1.1 Sex of Household Head

The 2004 Malawi demographic and health survey findings indicated that one in four households in Malawi is headed by a woman. The findings further indicated that female-headed households are more common in rural areas (26%) than in urban areas (17%). Sex of the household head was compared for households in Mzimba (rural area) and Lilongwe

(urban area) districts to see if there were any differences. The results are presented in Table 1.

Table 1: Comparative Sex of Household Head in Mzimba and Lilongwe Districts

	Sex of household head		
	Male	Female	Total
Mzimba	104 (65.0%)	56 (35.0%)	160 (100%)
Lilongwe	153 (72.9%)	57 (27.1%)	210 (100%)
Total	257 (69.5%)	113 (30.5%)	370 (100%)

χ^2 (1, 0.05) = 2.643, not significant at ρ= 0.05

Table 1 shows that 30.5% of the households interviewed were female headed households. In Mzimba more female headed households were interviewed (35.0%) compared to Lilongwe (27.1%), however, the differences were not statistically significant at ρ= 0.05. This agrees with findings from the 2004 Demographic and Health survey that female-headed households are common in rural than in urban area.

Sex of household head is an important factor in agricultural production. Male headed households tend to do better than female headed households because the latter are usually constrained in terms of resources, including labour. Topouzis (1998) reported that the effects of HIV and AIDS on female-headed households are severe. Female headed households tend to be poorer than other rural households due to less access to productive resources and to social/support services.

Table 2: Relationship between HIV and AIDS Status of the Household and Sex of the Household Head in Mzimba and Lilongwe Districts

	Sex of household head		
	Male	Female	Total
Non-affected	160 (62.3%)	25 (22.1%)	185 (50%)
Affected	97 (37.7%)	88 (77.9%)	185 (50%)
Total	257 (69.5%)	113 (30.5%)	370 (100%)

χ^2 (1, 0.05) = 50.567, significant at ρ= 0.00

Table 2 shows that 30.5 % of the households interviewed were female headed while 69.5 % were male headed. In relation to HIV, only 37.7 % of male headed households were affected by HIV and AIDS compared to 77.9 % of female headed households that were HIV and AIDS affected. This shows that female headed households are more affected by HIV and AIDS. In Mzimba, community members indicated that incidences of HIV and AIDS are increasing due to migration to South Africa to look for employment. They said that a lot of husbands go to work in South Africa leaving their families behind. Thus in many villages there are female headed households and this fuels the increase in HIV and AIDS pandemic. Topouzis (1998) reported that Women heading households with seasonal migrant husbands are vulnerable to HIV infection as their spouses may have other sexual partners at their place of work. The situation is not very different from Lilongwe, here, the community members indicated that where there is matrilineal system, the husband can just leave a wife for another one. Thus most households are headed by females.

4.1.2 Marital Status of Household Head

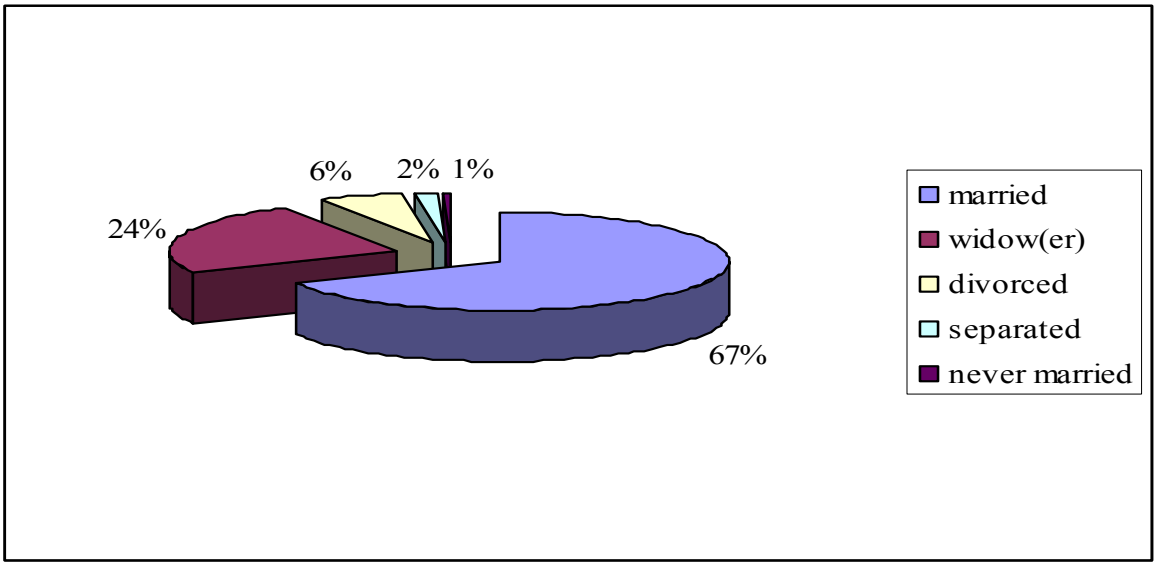


Figure 3: Marital Status of the Household Head

Figure 3 shows the marital status of the household head in both household categories. Of all the households interviewed, 67.57% household heads were married and the rest were single. The single households comprised of never married, separated, divorced and widowed. The widowed household heads represented the majority (24.82%) among the single households. Table 3 shows the comparison between affected and non-affected households with respect to the marital status of the household head.

Table 3: Relationship between HIV and AIDS Status and Marital Status of Household Head

	Marital status of household head		
	Single	Married	Total
Non-affected	29 (15.7%)	156 (84.3%)	185 (50%)
Affected	91 (49.2%)	94 (50.8%)	185 (50%)
Total	120 (32.43%)	250 (67.57%)	370 (100%)

χ^2 (1, 0.05) = 47.409, significant at ρ= 0.00

Almost half (49.19%) of the affected household heads were single, compared to the non-affected households where only 15.68% were single. This agrees with what was observed in Table 2, where most affected households were female headed.

4.1.3 Age of Household Head

Age is a crucial factor in food production. It affects the effectiveness of carrying out farm activities. It is expected that the middle-aged group (15-49) will be more effective in its production work than the young or old groups, because they are still active and energetic.

Table 4: Relationship between HIV and AIDS Status of Household and Age of Household Head

	HIV& AIDS status			
	Non-affected (n=185)	Affected (n=185)	t-statistic	ρ-value
Mean age of household head	42.31	40.86	1.039	0.299
Standard deviation	16.086	10.165		

The mean age for the non-affected households is 42.31 years while for the affected households was 40.86 years. The difference, however, is not statistically significant at 5 %

level of significance. The mean age in both household categories fall in the range of 15-49 which is regarded as the economically productive age. NAC (2004) report indicates that about three-quarter of AIDS cases are found among adults between the ages of 20 and 40. Since this is the most economically productive segment of the population, deaths in this age group are an unfortunate economic burden. Many productive years and much investment in education and training will be lost.

4.1.4 Education Level of Household Head

Education level plays a crucial role in agricultural production, in terms of understanding cultural practices, technology adoption and seeking extension services. It is also crucial in terms of HIV prevention messages. An educated person will be able to understand and follow HIV prevention methods. Lionberger (1960) reported that level of education is one of the important factors that determine the speed and the rate of adoption of new farm practices and technologies. Schooling has been valued as a means of increasing knowledge about knew technologies and schooling facilitates learning which in turn is presumed to instill a favourable attitude towards the use of improved farm practices. When the level of education is high, it is expected that one will be able to follow the right cultural practices, understand extension messages better and follow HIV prevention methods, hence achieve high levels of production. The level of education was compared between the two household categories to see if there were any differences.

Table 5: Years of Schooling of Household Head in HIV& AIDS Affected and Non-affected households

	HIV status			
	Non-affected (n=185)	Affected (n=185)	t-statistic	ρ-value
Mean education level of household head (years)	6.14	6.65	-1.459	0.145
Standard deviation	3.22	3.61		

The mean years in school were 6.14 for household heads in non- affected households and 6.65 for heads in affected households. Although the mean was slightly higher in affected households, the difference is not statistically significant (ρ= 0.145). This implies that both household categories were the same in terms of education level and as far as education is concerned, were to seek extension services, adopt technologies, and understand cultural practices and HIV and AIDS prevention messages equally. The results on extension services indicate that both household categories seek extension services equally. The number of times a household was in contact with an extension worker is about six in a year for both household categories. This is attributed to the same levels of education between the affected and non-affected household.

The distribution in education shows that most of the respondents have gone up to primary education in both household categories. Very few reported to have reached secondary and tertiary levels. This is depicted in Table 6.

Table 6: Comparative Distribution in Education Levels between HIV and AIDS Affected and Non-affected Households

	HIV&AIDS status		
	Non-affected (%) (n=185)	Affected (%) (n=185)	Total (%) (n=370)
None	4.3	4.9	9.2
Primary	37.6	32.7	70.3
Secondary	7.8	12.2	20.0
Tertiary	0.3	0.3	0.5
Total	50.0	50.0	100.0

4.1.5 Size of the Household

The household size helps to determine the amount of labour available in a household. When the size is big and composed of more adults, the amount of family labour available for agricultural production will also be high. The size of household is also crucial when it comes to issues of food security and per capita income. When food production is not enough, a household with more members will have more problems than the one with fewer members. Per capita income also tends to be low for households with more members than that with less members assuming the households earn equal amounts of income. Comparison was made between the two household categories in terms of household size.

Table 7: Comparative Size of Household between Affected and Non-affected Households

	HIV&AIDS status			
	Non-affected (n=185)	Affected (n=185)	t-statistic	ρ-value
Mean size of household	4.7	5.3	-2.766	0.006
Standard deviation	2.163	2.451		

The mean household size for affected households is 5.3 and is larger than that of non-affected households (4.7). This difference is statistically significant at less than 5% level of significance. The mean household size, in both categories, was higher than the national average estimated at 4.5 (NSO, 2005). This shows that the affected households have comparatively more mouths to feed than the non-affected households. That is, food and income is distributed among few people in non-affected households than in the affected households. The two household categories differed in terms of food and income; this is shown in sections 4.3 and 4.4 of chapter 4.

4.1.6 Land Holding Size of the Household

The size of land that a household owns determines its behavior in terms of type and number of crops produced. When the land holding is large, a household tends to grow different types of crops, both food and cash crops. When the land holding is small, however, a household is limited in the number of crops grown and tends to prioritize food crops. The mean land holding size for the affected and non-affected households was computed and tested for significant differences.

Table 8: Comparative Land Holding Size, and Land Cultivated in 2005/06 between HIV& AIDS affected and Non-Affected Households

	HIV status			
	Non-affected (n=185)	Affected (n=185)	t-statistic	ρ-value
Mean land owned by household (ha)	1.3 (1.01545)	1.2 (0.91881)	1.338	0.182
Mean land cultivated by household (ha)	1.2 (0.85066)	0.9 (0.74635)	3.152	0.002

Figures in parentheses are standard deviations

Table 8 shows that non-affected households had slightly large land holdings compared to affected households. However, there was no statistically significant difference in the land holding sizes between the two groups. This result implies that the two household categories behaved the same in terms of type and number of crops that they produced.

Table 9: Type of Crops Grown in HIV Affected and Non-affected households

	HIV status of household		
Type of crop	non-affected	Affected	Total
Maize	183 (20.7%)	180 (20.4%)	363 (41.10%)
Groundnuts	115 (13.0%)	116 (13.1%)	231 (26.20%)
Tobacco	41 (4.6%)	31 (3.5%)	72 (8.20%)
Sweet potatoes	16 (1.8%)	13 (1.5%)	29 (3.30%)
Cassava	7 (0.8%)	2 (0.2%0	9 (1.00%)
Beans	27 (3.1%)	24 (2.7%)	51 (5.80%)
Soybeans	41 (4.6%)	56 (6.3%)	97 (11.00%)
Millet	7 (0.8%)	5 (0.6%)	12 (1.40%)
Paprika	3 (0.3%)	2 (0.2%)	5 (0.60%)
Irish potatoes	5 (0.6%)	3 (0.3%)	8 (0.90%)
None	1 (0.1%)	5 (0.6%)	6 (0.70%)
TOTAL	446 (50.5%)	437 (49.5%)	883 (100%)

Table 9 shows the types of crops grown in affected and non-affected households. The crops grown in both household categories were the same, that is, both food and cash crops. The situation can be attributed to the fact that both households have the same land holding size (Table 8). The non-affected households dominated in most of the crops, but for some crops

such as soy beans and groundnuts, the affected households were dominating. This was the case because the AIDS support groups encouraged people living with HIV and AIDS to utilize the crops due to their nutritional value.

4.1.7 Total Land Cultivated

Government of Malawi (GoM), (2002) estimated that 25% of the smallholder farmers cultivate less than 0.5 hectares on average; 30% cultivate between 0.5 and 1.0 hectare; 31% cultivate between 1.0 and 2.0 hectares, and only 14% cultivate more than 2.0hectares. The amount of land cultivated by a household in a growing season would be determined by the quantities of inputs available to the households. These inputs include labour, seed and fertilizer among others. When these inputs are not available or are in short supply a household may leave some of its land uncultivated. Table 8 gives the mean land cultivated in HIV affected and non-affected households.

Although there was no significant difference in land holding size between affected and non- affected households, the affected households cultivated less of their land. Table 8 shows that the mean cultivated land in the affected household category was 0.9 ha, while it was 1.2 ha for the non-affected households. The difference was statistically significant at 5% level of significance ($\rho = 0.002$). The HIV affected households fall in the 30% of the households in Malawi who cultivate between 0.5 and 1.0 hectares of land. The less cultivated land in affected households could be attributed to less or no inputs especially labour. Discussion with community members revealed that labour is always a problem in affected households due to frequent sickness, and lack of energy to work effectively.

4.2 Effects of HIV and AIDS on Physical Factors of Production

HIV and AIDS adversely impact on the physical factors of production which would in turn affect the actual production. These factors include; land, labour and capital. HIV affected households are mostly prone to losing access to their land to relatives and selling due to chronic illness. This would result in cultivating small portions of land or not cultivating at all. Labour is another crucial factor in agricultural production. When it is scarce, a household may not be able to meet its food requirements through production. Inadequate labour supply due to HIV and AIDS would limit agricultural and food productivity, which in turn affects food availability, accessibility, and stability (Mataya *et. al*., 1998). HIV and AIDS could reduce labour supply through morbidity and deaths.

The physical factors of production considered in this study include land, labour and fertilizer. These determined the amount of maize that a household produced, which in turn determined the amount of food in a household. The amount used for these factors were computed for each household category and tested for significant differences.

Table 10: Comparative Physical Factors of Production in Maize Enterprise, between HIV and AIDS Affected and Non-affected households.

	HIV status			
	Non-affected (n=185)	Affected (n=185)	t-statistic	ρ-value
Mean land allocated to maize (ha)	0.8 (0.533)	0.6 (0.419)	3.232	0.001
Mean amount of fertilizer(kg)	108.0 (92.084)	82.0 (78.998)	2.749	0.006
Mean amount of labour (man-hours)	9.5 (6.130)	8.1 (5.936)	2.328	0.02

Figures in parentheses are the standard deviation

Table 10 presents significantly mean differences in land allocated to maize (ρ= 0.001), fertilizer applied (ρ= 0.006) and labour used (ρ=0.02) between affected and non-affected households. Non-affected households seem to be doing better in all physical factors of production considered in this study. From this result, it is expected that the non-affected households will produce more maize than the affected households.

Table 11: Comparative Maize Production in HIV and AIDS Affected and Non-affected Households

	HIV status			
	Non-affected (n=165)	Affected (n=165)	t-statistic	ρ-value
Mean maize produced by household in 2005/06 (kg)	1251.1	778.9	4.608	0.000
Standard deviation	1121.4502	689.5407		

The results in Table 11 show that affected households produced less maize than the non-affected households in 2005/06 growing season. This was attributed to allocating less physical factors of production (Table 10), among other things. The most determining factor is the labour. When labour is not enough, a household is forced to allocate less land to production. Coupled by lack of inputs, especially fertilizer, a household is likely to produce less maize. Community members indicated that affected households spend a lot of money on medication and appetizing types of food that they have little left for inputs such as fertilizer and labour; hence they use less of these inputs. This result in less amount of food produced in HIV and AIDS affected households.

In Ethiopia, a study found that AIDS-afflicted households spent 50-66 percent less time on agriculture than households that were not afflicted (FAO, 2001). In this study, however,

HIV and AIDS affected households spent 15% less time on crop production than the non-affected households. It was also indicated that labour saving technologies can help alleviate the problem of inadequate labour. However, these technologies were not practiced, apart from mixed cropping to a lesser extent, in the study areas during the time of the survey. The agriculture officers for both districts also alluded to the fact that labour is a major production problem in HIV&AIDS affected households. In Lilongwe, the agriculture office has started promoting zero tillage, a labour saving technology to some farm families affected by HIV&AIDS. It was indicated that the programme is a success but the limitation is lack of funds to reach many families.

4.3 Relationship Between HIV and AIDS and Food Security

In section 4.2, it has been established that HIV affected households were limited in the physical factors of production especially labour and fertilizer. This caused low maize production in the affected household category compared to the non-affected category. It has also been shown that the household size was large in affected compared to the non-affected households (Table 6). With this background, it was expected that affected households would face more food problems than non-affected households.

4.3.1 Household Food Availability

The study used month of food depletion to assess household food availability, taking the month of May as the month of harvest. The households were asked to mention the month when their maize stocks were depleted from the month of harvest. The months of food

depletion were then compared between affected and non-affected households and the results are presented in Table 12.

Table 12: Month of Food Depletion in HIV Affected and Non-affected Households

	HIV Status of household		Total
	Non-affected	Affected	
June	1 (0.5%)	9 (4.9%)	10 (2.7%)
July	2 (1.1%)	8 (4.3%)	10 (2.7%)
August	9 (4.9%)	11 (5.9%)	20 (5.4%)
September	9 (4.9%)	12 (6.5%)	21 (5.7%)
October	19 (10.3%)	24 (13.0%)	43 (11.6%)
November	18 (9.7%)	17 (9.2%)	35 (9.5%)
December	21 (11.4%)	30 (16.2%)	51 (13.8%)
January	18 (9.7%)	20 (10.8%)	38 (10.3%)
February	20 (10.8%)	15 (8.1%)	35 (9.5%)
March	7 (3.8%)	7 (3.8%)	14 (3.8%)
April	1 (0.5%)	0 (0%)	1 (0.3%)
May	59 (31.9%)	22 (11.9%)	81 (21.9%)
Not applicable	1 (0.5%)	10 (5.4%)	11 (3.0%)
Total	185 (100%)	185 (100%)	370 (100%)

$\chi^2(12, 0.05) = 38.911$, significant at $\rho = 0.00$

Table 12 shows that 31.9% non-affected households had food throughout the year compared to 11.9% affected households who had food throughout the year. The table also shows that by December, 60 % of the affected households did not have food compared to

42.8% non-affected households who depleted their food by December. The differences were statistically significant at 1% level of significance.

4.3.2 Household Food Stability

In this study, food stability refers to the ability of a household to access food even in the presence of shocks. A shock, in this case, is any situation which will lead to food stock depletion in a household. Number of meals eaten by a household when food stocks are depleted was used to assess food stability in a household. A meal in this study meant main meals (large and more filling) and not snacks and included breakfast, lunch and supper Comparison was then made between HIV affected and non-affected households.

Table 13: Comparative Number of Meals taken when Food Stocks are depleted in HIV and AIDS Non-affected and Affected Households

	number of meals per day when food stocks are depleted			Total
	1 Meal	2 Meals	3 Meals	
Non-affected	44 (34.9%)	71 (56.3%)	11 (8.7 %)	126 (100%)
Affected	59 (36.4%)	78 (48.1%)	25 (15.4%)	162 (100%)
Total	103 (35.8%)	149 (51.7%)	36 (12.5%)	288 (100%)

χ^2 (3, 0.05) = 23.763, significant at ρ= 0.00

The results in Table 13 indicate that more affected households (36.4%) ate at least a meal in a day after food stock depletion compared to non affected households (34.9%) and the differences were statistically significant at 10% level of significance (ρ= 0.0636). The situation was like that because all the affected households interviewed belonged to AIDS support groups. Through the support groups, the members accessed medical help and food

items among other things. The AIDS support groups receive assistance from various organizations but mainly from Tovwirane in Mzimba and NAPHAM in Lilongwe. Almost all members of the support groups are on Antiretrol Viral Drugs (ARVs) which require one to eat frequently. Because of this, the members are given food to ensure that they eat regularly.

In terms of food stability, however, the results show that non affected households are better off than the affected households. About 65% of the non affected households managed to eat two or more meals in a day compared to about 63.3% affected households who managed to eat two or more meals in a day after food stock depletion.

4.3.3 HIV and AIDS and Food Self-Sufficiency

In this study, food self-sufficiency from own production was calculated. This was based on the time of food stock depletion. If a household indicated that the maize harvest of one season is not depleted until the next harvest, it was considered to be food self-sufficient from own production. If the maize stocks were depleted before the next harvest, the household was considered to be food insufficient. The two household categories were then compared in terms of food sufficiency from own production.

Table 14: Food Self-Sufficiency from own Production in HIV&AIDS Affected and Non-affected Households

	HIV status		
	Non-affected	Affected	Total
Food insufficient	125 (33.8%)	163 (44.1%)	288 (78.8%)
Food sufficient	60 (16.2%)	22 (5.9%)	82 (22.2%)
Total	185 (50%)	185 (50%)	370 (100%)

χ^2 (1, 0.05) = 22.624, significant at ρ= 0.00

Table 14 shows that 78.8% of all the respondents were not food self-sufficient during the time of the survey (October-November 2006). Only 22.2% were food sufficient. Out of the 78.8% who were food insufficient, 56.60% were affected households. The differences were statistically significant at ρ= 0.05. This implies that affected households were not able to produce enough food to last them throughout the year compared to non-affected households. This agrees with results from focus group discussions, where community members indicated that food shortage was a common problem for both types of households; however, most affected households were not able to produce enough food for the whole year, as such they faced acute food shortages.

4.3.2 Other Factors Affecting Food Security Self-Sufficiency

Apart from HIV, there are also other factors which may affect food self-sufficiency, these include, levels of food production, household size and total land holding size. Thus, it was also worthy to isolate the effects of these factors.

Table 15: Factors that Affect Food Self-Sufficiency

	Food self-sufficiency			
	Insufficient (n=288)	Sufficient (n=82)	t-statistic	ρ-value
Mean household size (number of people)	5.1 (2.333)	4.7 (2.318)	1.355	0.176
Mean land holding size(ha)	1.2 (0.931)	1.5 (1.044)	-3.217	0.001
Mean maize production (kg)	799.8 (745.851)	2061.1 (1206.104)	-11.410	0.000

Figures in parentheses are the standard deviation

Table 15 shows that the size of the household had no effect on food sufficiency since there was no significant difference in the mean household size between food sufficient and food insufficient households. Land holding size and quantities of maize produced determined whether the household would be food sufficient or not. The mean land holding and quantity of maize produced were significantly different between food sufficient and insufficient household.

4.4 Relationship Between HIV and AIDS and Poverty

The levels of poverty were calculated and compared between HIV and AIDS affected and non-affected households. It was hypothesized that poverty levels would be higher in HIV and AIDS affected compared to the non-affected households.

4.4.1 Income Levels in HIV Affected and Non Affected Households

Income is essential for the basic needs of the household. These needs include both food and non-food items. When a household is not able to produce enough food, income can be used to access the food and still maintain its food security status. Income is also essential in production especially for the purchase of inputs such as land, fertilizer and even labour if a household is not able to supply. Household income level is also useful in poverty analysis,

that is, it helps to determine whether a household is poor or not based on the per capita income. The annual per capita incomes were computed for the HIV and AIDS affected and non-affected households and compared to determine if there were any differences.

Table 16: Comparative Annual Per Capita Income in HIV and AIDS Affected and Non-affected Households

	HIV status			
	Non-affected (n=185)	Affected (n=185)	t-statistic	ρ-value
Mean per capita income per year (MK)	8938.3	7742.2	0.71	0.478

The results in Table 16 show that the annual per capita income is higher in non-affected than in the affected households. Although there was a slight difference, it is not statistically significant (ρ= 0.478). This means that the income levels in these households are statistically the same. Although this is the case, the non-affected households are better off. They produce more food and are more food sufficient than the affected households, thus it is expected that the amount of income they will spend on food will be less than the amount of income spent on food by the affected households. The non-affected households can, therefore, use some of their income for other needs, such as farm inputs, asset accumulation among others.

4.4.2 Assets Owned by the Households

An asset in this study is defined as anything owned by the household, which can be quickly converted into cash in time of need. Assets are used to cushion shocks in a household. The shocks include food shortages, deaths, and sickness among others. When a household is faced by food shortages, for example it can sell some of its assets and use the money to buy

food. Table 17 displays the types of assets owned by the households in both household categories.

Table 17: Assets Owned by HIV and AIDS Affected and Non Affected Household

Asset	Non-affected Households	Affected Households	Total Households
Livestock	111 (13.7%)	98 (12.1%)	209 (25.8%)
Bicycle	82 (10.1%)	70 (8.7%)	152 (18.8%)
Radio	90 (11.1%)	87 (10.8%)	177 (21.9
Chairs	64 (7.9%)	62 (7.7%)	126 (15.6%)
Oxcarts	10 (1.2%)	10 (1.2%)	20 (2.5%)
Plough	2 (0.2%)	2 (0.2%)	4 (0.5%)
Sewing machine	1 (0.1%)	2 (0.2%)	3 (0.4%
Bed/mattress	21 (2.6%)	22 (2.7%)	43 (5.3%)
None	30 (3.7%)	45 (5.6%)	75 (9.3%)
Total	411 (50.8%)	398 (49.2%)	809 (100%)

Both household categories own the same types of assets. In terms of frequencies of the number of households owning a particular asset, the differences are very minimal with non-affected dominating in most instances.

4.4.3 Poverty Analysis

4.4.3.1 Population Above and Below the Poverty Line

Poverty line is the threshold level of welfare that distinguishes poor households from non-poor households (NSO, 2005). It gives a measure of welfare indicator below which a

person is deemed poor. Poverty line can be described as a subsistence minimum. It is comprised of two parts. The first part is the minimum food expenditure based on the food requirements of an individual. The critical non-food consumption forms the second component of the poverty line. The current poverty line for Malawi is at MK16, 165 per person per year (NSO, 2005).

Per capita incomes were calculated and compared with the poverty line, for both affected and non affected households. This was done to determine the populations which were above and below the poverty line in both household categories. The results are presented in Table 18.

Table 18: Population Below and Above the Poverty Line in HIV Affected and Non-affected Households

	HIV Status of Household		Total
	non affected	Affected	
Population below poverty line	155 (90.6%)	163 (95.9%)	318 (93.3%)
Population above poverty line	16 (9.4%)	7 (4.1%)	23 (6.7%)
Total	171 (100%)	170 (100%)	341 (100%)

χ^2 (1, 0.05) = 3.720, significant at ρ= 0.05

The results in Table 18 show that 95.5% of the affected households which were interviewed were below poverty line during the time of study compared to 90.6% of the non-affected households. The difference was statistically significant at 5 % significance level. The results imply that most of the affected households were living below the

minimum subsistence during the time of the survey, compared to the non-affected households.

4.4.3.2 Poverty Measures

The poverty measures capture three aspects of poverty, its prevalence or incidence, depth and severity. The indices were calculated for each household category; affected and non-affected and tested for significant differences using t-statistic. The lower the index for the poverty measure, the better the poverty situation (Khandker & Chowdhury, 1996). The results are presented Table 19.

Table 19: Comparative Poverty Indices between HIV Affected and Non-affected Households

	Affected Households	Non-affected Households	Z-value	ρ-value
H	0.959	0.912	1.760*	0.039
PG	0.727	0.616	2.181*	0.015
SPG	0.636	0.658	0.425	0.334

* Significant at 5%

Key to Table 16

H = Head Count Index
PG = Poverty Gap Index
SPG = Squared Poverty Index

Table 19 shows that the headcount index and the poverty gap index were higher for the affected households than for the non-affected. This difference was significant at ρ=0.05. The squared poverty gap index was lower in the affected than in the non-affected households. However, the difference was not statistically significant. This indicates that the

prevalence and depth of poverty are high in affected than in non-affected households. Poverty severity, however, is the same in both household categories. The results are consistent with observations from focus group discussions. The community members indicated that both household categories are poor but the prevalence and depth of poverty are more pronounced in the HIV and AIDS affected households.

CHAPTER 5

MODIFIED COBB-DOUGLASS PRODUCTION FUNCTION FOR DETERMINANTS OF MAIZE PRODUCTION

5.0 Introduction

The chapter gives the results of the modified Cobb-Douglas production function. It also indicates the overall model significance and the significance of the individual variables used in the model and their implications.

5.1 The Modified Production Function

Table 20: Determinants of Maize Production in Lilongwe and Mzimba Districts (modified C-D production function)

Variable	Coefficient	S.E	t-value	Sig
Constant	3.095	0.333	9.289***	0.000
HIVSTATU	-0.309	0.086	-3.588***	0.000
EDUCATN	0.026	0.013	1.990**	0.048
EXTVISIT	0.172	0.088	1.945*	0.053
LANDMAIZ	0.312	0.086	3.638***	0.000
LABOUR	0.160	0.068	2.334**	0.020
FERTILIZ	0.687	0.065	10.612***	0.000
INCOME	1.44E-006	0.000	1.837*	0.067

R^2 = 59.6%, R^2_{adj} = 58.5%, VIF= 1.239, DW= 1.53,

F_c (0.05, 7,265) = 55.864, F_t (0.05, 7,265) = 2.64

*** Significant at 1% ** Significant at 5% * Significant at 10%

Key to Table 20

Dependent variable:

1. MAIZOUT : Natural log of maize output (kg)

Independent Variables

2. HIVSTATUS : HIV status of the household (dummy : 0=non-affected and 1= affected)
3. EDUCATN : Level of education of household head (number of years in school)
4. EXTVISIT : Extension visit (1=extension visit and 0= no extension visit)
5. LANDMAIZ : natural log of total land allocated to maize production (ha)
6. LABOUR : natural log of household labour (man-hours)
7. FERTILIZ : natural log of fertilizer applied in maize (kg)
8. INCOME : total income earned by household in a year (MK)

5.1.1 Overall Fitness of the Statistical Model

The adjusted coefficient of determination, (R^2_{adj}), was 0.585, indicating that 58.5% of the variation in maize production was explained by the variables in the production function. The other variation could be attributed to other factors such as rainfall patterns and soil type among others, which were not taken into consideration in this study. Gujarati (1995) states that the fit of the model is said to be 'better' when R^2 is closer to 1. The model also had a higher F-value of 55.864 (significant at ρ= 0.05) compared to the tabulated F-value of 2.64 implying that the model is significant, that is the true slope coefficients of all the explanatory variables were significantly different from zero.

5.1.2 Significance of the Independent Variables

In the model, the coefficients for the physical factors of production (land, labour, fertilizer) are the partial elasticities of the quantities of maize produced with respect to the physical factors of production. That is, they measure the percentage change in maize production with respect to a change in the explanatory variable. The positive or negative sign of the

coefficients indicate the direction of the change or effect. Table 20 shows that all the coefficients of physical factors of production were significant and their signs were positive. This indicates increasing marginal productivity to these factors, that is, when the input quantities were increased, there was also an increase in quantities of maize produced. Output elasticities for land, labour and fertilizer were 0.312, 0.160 and 0.687, respectively. This means that holding all other factors of production constant, a one percent increase in land will cause a 0.3% increase in maize output. Similarly, a one percent increase in labour will cause about 0.2% increase and a one percent increase in fertilizer will cause about 0.7% increase in maize output.

The results also indicate that all the socio-economic factors in the model are statistically significant in explaining the variations in the dependent variable. HIV status of the household had a negative effect on maize production, this implies that, when a household was affected (household head or spouse was HIV infected), the amount of maize produced was low compared to the household which was not affected. This agrees with results in Table 11, in which the amount of maize produced in 2005/06 season, in affected and non-affected households was compared. The results indicated that non-affected households produced more maize than the affected households.

The figures presented in Table 10 show that HIV and AIDS affected households allocated 19.8% less land, 15.3% less labour and 24.1% less fertilizer than the non-affected households. The less allocation of the physical factors of production led to a drop in the amount of maize produced by the affected households. From Table 11, non-affected

households produced an average of 1251.1 kilograms of maize and affected households produced an average of 778.9 kilograms. Thus when a household was affected (head or spouse is HIV infected), its maize production dropped by 472.2 kilograms, representing a 38% reduction.

The negative effect that HIV and AIDS have on food production is that it reduces the amount of physical factors of production (land, labour and capital) that a household can allocate to food production. This leads to low food production.

The other socio-economic variables (education, extension visit and household income) had positive effects on maize production. This implies that when one is educated, is in contact with the extension worker and earns more income, the person will produce more amount of maize than the one who is not educated, is not in contact with extension worker and earns less income.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

Introduction

The chapter gives an overview of all the conclusions made from this study. It also outlines the recommendations drawn from the study.

Conclusion

The study has established that there is a negative linkage between HIV and AIDS, food production, food security and poverty. In HIV affected households, physical factors allocated to maize production are less than those in non-affected households. Affected households allocated 19.8% less land, 15.3% less labour and 24.1% less fertilizer to maize production due to chronic illness. This, results to low food production, about 38% lower, in affected households compared to the non-affected households.

Food security situations also differ between affected and non-affected households. Mostly the non-affected households are food secure (availability, accessibility) compared to the affected households. About 16.2% of the non-affected households were food sufficient compared to 5.9% of the affected households who were food sufficient from own production. However, food stability in HIV affected households is boosted by the assistance they get from the AIDS support groups to which they belong.

The study has also established that poverty is more pronounced in HIV affected households than in the non-affected households although both household categories are poor. There are more people, about 95.9%, below the poverty line in affected households than in non-affected households, where 90.6% are below the poverty line. The analysis of poverty indices shows that although the severity of poverty is the same in the two household categories, its prevalence and depth is more pronounced in HIV affected households.

Recommendations

The following recommendations are made from the study:

- The government of Malawi through the Ministry of Agriculture and food Security should promote labour saving technologies such as zero tillage in HIV affected households and also provide farm inputs associated with it as a package. This will help the affected households to meet their food requirements without using a lot of labour.
- AIDS support groups should sensitize the communities on the importance of belonging to a support group so that people who have not yet revealed their status should do so and join the groups
- The government of Malawi with the help of non governmental organisations should help the support groups both financially and with other items such as food and medication. This will help the affected households to access food when they run out of their stocks and to access medical help within their communities
- The support groups with the help from government and non governmental organisations should establish businesses to be owned by the group and the proceeds from the business should be shared among its members. This will help to economically empower the affected households thereby reducing the depth and severity of poverty among affected households
- A similar research should be carried out which can be inferred to Malawi as a whole. The research should use a representative sample for Malawi targeting at least each and every district. This will help to have an understanding of how HIV and AIDS are affecting food production, security and poverty in Malawi as a whole.

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APPENDICES

Appendix 1: Household questionnaire

Household Identification

Name of Respondent_____

Household Category [1] Affected

[0] Non-affected

Extension Planning Area / Group Name_____

District _____

ADD_____

Date of interview_____

Enumerator_____

A. SOCIO-ECONOMIC CHARACTERISTICS OF THE HOUSEHOLDS

1. Sex of household head [1] Male

   [2] Female

2. What is the age of household head? _____(Years)
3. What is the Marital Status of household head?

   [1] Never married

   [2] Married

   [3] Divorced

   [4] Widow/widower

   [5] Separated

4. What is the level of education for the household head? _____(Years)
5. What is the total size of the household? _____ (*Number of people living under same roof, under same household head)*
6. What is the main occupation of the household head? (single response)

   [1] Farming

   [2] Wage employment,

   [3] Farm-*ganyu (casual labour)*

   [4] Non-farm *ganyu*,

   [5] Business

   [6] Others (Specify) _____

7. What position do the household head hold in the society?

[1] None [5] committee member

[2 Chief [6] political member

[3 VDC chairperson [7] volunteer

[4] Chief Councilors [8] others (specify) _____

8. Total land owned and cultivated by the household

Plot No.	**Plot Size (acres)**	**Area cultivated last season/ plot (acres)**
1		
2		
3		
4		
5		
Total		

B. FOOD PRODUCTION

9. What type of crops do you grow?

[1] Maize [5] Cassava

[2] Groundnuts [6] Beans

[3] Tobacco [7] Soybeans

[4] Sweet potatoes [8] others (Specify) _____

10. What is the total land size allocated to each crop and what was the production last season (2005/2006)

Crop	**Land allocated (acres)**	**Fertilizer applied (kg)**	**Production (kg)**
Maize			
Groundnuts			
Tobacco			
Sweet potatoes			
Cassava			
Beans			
Soybeans			
Others (specify)			

11. What types of inputs do you use in the production of maize?

[0] Improved maize seed varieties

[1] Fertilizer use

[2] Use of soil improvement technologies (specify) _____

[3] A combination of the above

[4] None

12. How many people are involved in maize production in a household (number)

Person (female / male)	Age	Average Hours per day

13. Do you have access to credit for maize production? [1] Yes

[0] No

14. How many times have you met with the extension worker within the past 12 months?

What type of Livestock do you keep?

[1] Cattle

[2] Goats

{3] Sheep

[4] Poultry

[5] Rabbits

[6] Pigs

[7] None

[8] Others (specify) _____

C. FOOD SECURITY SITUATION

15. Which month does your food last after harvest?

[1] June	[5] October	[9] February
[2] July	[6] November	[10] March
[3] August	[7] December	[11] April
[4] September	[8] January	[12] May

16. How many meals does your household have in a day when your food stocks are depleted?

[0] 1 [1] 2 [2] 3

17. How does the household source its food after depleting its stocks

[0] Donations,

[1] Buying from local markets,

[2] Buying from other households,

[3] Buying from ADMARC,

[4] Food for work,

[5] Borrowing

[6] Begging

[7] Winter cropping

[8] Have food throughout the year

[9] Others (specify) _____

18. If the household buys its food, what is the source of income used in buying food?

[0] Selling other major crops	[5] selling livestock
[1] Self-employment	[6] selling household items

[2] Formal employment [7] renting out land

[3] On-farm *ganyu (casual labour)* [8] business

[4] Remittances [9] others (specify) _____

19. How frequently does your household buy its food?

[0] Daily [3] Monthly

[1] Fortnightly [4] Never

[2] Weekly

20. What other coping mechanisms do you normally use when food stocks are depleted?

[0] Work for food

[1] Work for cash

[2] Formal employment

[3] Remittances

[4] Winter cropping

[5] None

[6] Others (specify) _____

HOUSEHOLD INCOME AND ASSETS

21. Has the household received any of the following during the last 12 months?

Source	**Income per month**	**Total income (MK)**
Gifts		
Remittances		
Business		
Formal employment		
Others (specify)		
TOTAL INCOME		

22. Do you sell some of your crops [1] Yes

[2] No

23. If yes, what was the income from realized from crops during 2005/2006 season?

Crop	**Amount sold**	**Price/ unit**	**Income (MK)**
Maize			
Groundnuts			
Tobacco			
Sweet potatoes			
Cassava			
Beans			
Soybeans			
Others (specify)			
TOTAL INCOME			

24. Do you sell some of your Livestock? [1] Yes

[2] No

25. If yes what was the income from livestock and livestock products realized over the past 12 months

Type of livestock	**Income**	**Livestock product**	**Income (MK)**
Cattle		Milk	
Goats		Eggs	
Sheep		Others (specify)	
Poultry			
Rabbits			
Pigs			
Others (specify)			
TOTAL INCOME FROM LIVESTOCK & PRODUCTS			

26. What assets do your household own? (***Things easily liquidated into cash***)

[1] Livestock [2] bicycle [3] radio

[4] Chairs [5] oxcart [6] none [7] others (specify) _____

27. Income lost through uncultivated areas in 2005/06 season

Crop	**Land allocated to the crop (acres)**	**Land uncultivated (acres)**	**Normal average yield (kg/ha)**	**Income lost (MK)**
Maize				
Groundnuts				
Tobacco				
Sweet potatoes				
Cassava				
Beans				
Soybeans				

Others (specify)				
TOTAL INCOME LOST				

28. Reasons for leaving part of the land uncultivated (multiple answers)

[1] Shortage of labour

[2] Lack of inputs due to death of income earner

[3] Lack of inputs due to high prices

[4] None

[5] Others (specify)

KNOWLEDGE OF HIV AND AIDS

29. How does HIV AND AIDS affect food production, food security and poverty? Explain

[1] No effect

[2] Reduced labour leading to low production

[3] Labour diversion when somebody in the household is sick

[4] Money is diverted to medication

[5] Lack of energy to work efficiently

[6] Chronic illness leads to fields not attended

[7] Others (specify) _____

30. What do you think should be done to reduce the impact of HIV and AIDS on food production and security?

[1] Small-scale credit to PLWHAs

[2] Introduce labour saving technologies (***give examples***) _____

[3] Community members should help PLWHAs with fieldwork

[4] PLWHAs should be given inputs (fertilizer, improved seed)

[5] Don't know

Appendix 2: Checklist for focus group discussions with the community members

Knowledge of HIV and AIDS

1. What do you consider to be the most serious problems facing the community at present?
2. Is chronic illness or long-term illness a serious problem among the community members? Which diseases are common?
3. ***If HIV and AIDS are not mentioned***, do you think HIV and AIDS are contributing to chronic illness?
4. If yes, which categories are mostly affected by HIV and AIDS?
5. Are there any efforts by community/extended family members to assist families affected by chronic illness?
6. How do they help?

Food Production, Security, poverty and HIV and AIDS

7. What are the major crops grown in the area?
8. What are the types of livestock found in the community
9. What has been the trend in maize production over the years (increasing, decreasing, no change)
    - ✓ 1980s
    - ✓ 1990s
    - ✓ 2000s
10. What has been the cause for the trend?
11. Do you think HIV and AIDS are contributing to the trend?

12. If yes, how? (provide specific example to illustrate)
13. What has been the trend in household food availability over the time?
14. What has been the cause for the trend?
15. Do you think HIV and AIDS are contributing to the trend?
16. If yes, how? (provide specific example to illustrate)
17. What is the food security situation among HIV and AIDS affected and non-affected households?
18. What are the coping mechanisms in each household category?
19. What has been the trend in poverty levels in the community over the years?
20. What has been the cause for the trend?
21. Do you think HIV and AIDS are contributing to the trend?
22. If yes, how? (provide specific example to illustrate)
23. What are the characteristics for the poor?
24. What are the types of assets owned by households in the community?
25. What should be done to mitigate the impact of HIV and AIDS on
    - ✓ Maize production
    - ✓ Food security
    - ✓ Poverty levels

Appendix 3: guiding questions for the interview with the village headman

1. What is the situation of crop production in the community
2. Why is the situation as such?
3. What is the impact of HIV and AIDS on crop production?
4. What is the situation of food security in the community?
5. What are the major causes for food insecurity in the community?
6. Are HIV and AIDS among the reasons?
7. How do HIV and AIDS affect food security?
8. What is the situation of poverty in the community?
9. What are the reasons for the current situation?
10. Do HIV and AIDS have any impact on poverty levels, how?
11. What are the types of assets owned by the households in the community?
12. What is the situation of HIV and AIDS in the community?
13. Why is the situation as such?
14. What should be done to reduce the impact of HIV and AIDS?

Appendix 4: guiding questions for the interview with the DADO

1. Total number of farm families in the district
2. Total number of female headed households
3. Average land holding size for smallholder farmers
4. What are the major crops grown in the area?
5. Average yield of local and hybrid maize last season (2005/06)
6. Average yield of local and hybrid maize the past five years?

7. Reasons for changes in maize production
8. Do HIV and AIDS affect Agricultural production and food security, how?
9. What can be done to reduce the impact of HIV and AIDS on agricultural production and food security?