ECONOMIC IMPACT OF HIV/AIDS ON SMALLHOLDER AGRICULTURE IN MOPANI DISTRICT OF LIMPOPO PROVINCE

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DECLARATION

I Matlhabjane Maria Maponya hereby declare that the thesis for the Masters of Science in Agricultural Economics degree at the University of Venda hereby submitted by me, has not previously been submitted for a degree at this or any other University, and that it is my own work in design and execution and all reference materials contained therein have been duly acknowledged.

Signed

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ABSTRACT

In South Africa the smallholder sector constitutes a major component of the agricultural industry and this sector provides livelihood for the majority of the rural population. The HIV/AIDS is a generalized epidemic in South Africa that extends to all age groups, geographic area and race. South Africa has a serious HIV/AIDS epidemic, with the millions of its people living with the disease. In settings where this subsistence agriculture is a norm, HIV/AIDS retards agricultural production, and threatens food security in several ways.

This study has attempted to go beyond the official statistics and the general literature to capture information on the economic impact of HIV/AIDS on smallholder Agriculture in Mopani district of Limpopo province. The objective of this study was to assess the impact of HIV/AIDS and other related socio-economic variables on agricultural labour (as the integral part of agriculture) among smallholder farmers in four municipalities in Mopani district of Limpopo province and to identify the coping strategy adopted by HIV/AIDS affected smallholder farmers to mitigate the impact of HIV/AIDS.

Descriptive statistics, correlation analysis and ordinary least square regression analysis were used to analyse data on one hundred and fifty seven (157) smallholders' farmers in Greater Tzaneen municipality, one (100) hundred smallholders' farmers in Greater Giyani, ninety two (92) smallholders' farmers in Greater Letaba and fifty one (51) smallholders' farmers in Ba-Phalaborwa who were randomly selected to make a total sample size of four hundred (400).

The findings of this study reveal that, HIV/AIDS has a negative impact on the smallholder farmers in the four municipalities namely: Greater Tzaneen, Greater Giyani, Greater Letaba and Ba-Phalaborwa in terms of labour reduction due to the death of household members and chronic diseases suffered by different household's members. Household farm labour shortages

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as the integral part of farming had a negative impact on the agricultural operations and this led to a reduction in farm income and farm output.

The coping strategies adopted include a reduction in farm area cultivated and a shift from labour intensive crops to labour saving crops. The findings in this study suggest the need to develop and promote appropriate and life changing policy frameworks and mitigation programmes, to meet the urgent needs of the smallholder farmers affected by the HIV/AIDS epidemic.

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LIST OF ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
EWRRS	Early Warning Rapid Response System
FAO	Food and Agricultural Organisation
HIV	Human Immunodeficiency Virus
IDP	Integrated Development Plan
IEC	Information, Education and Communication
NGO	Non Governmental Organisation
SAFAIDS	Southern Africa AIDS Information Dissemination Service
SADC	South African Development Community
SEA	South East Asia
SPSS	Statistical Package for Social Science
T.B	Tuberculosis
UNDP	United Nations Development Programme
USA	United State of America

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CHAPTER 1

INTRODUCTION

1.1 PRELIMINARY CONSIDERATION

Hubley (1995) described HIV as the human immunodeficiency virus, the virus that causes AIDS (Acquired Immuno Deficiency Syndrome). His findings indicate that the virus rapidly multiplies in the blood; stimulating the development of antibodies, thus result in illness and death.

HIV/AIDS is a generalized epidemic in South Africa that extends to all age, groups, geographic areas and ethnical groups. South Africa has a serious HIV/AIDS (Human Immunodeficiency Virus/Acquired Immuno Deficiency Syndrome) epidemic, with millions of its people living with the disease. A study conducted by the Nelson Mandela foundation/human sciences research council (HSRC, 2002) on HIV/AIDS estimates that the HIV prevalence in the population of South Africa was 11.4%. It has also been observed that 19.94% of people in the 15-49 year group are HIV positive.

HIV/AIDS has been described as one of the greatest development challenges, largely as a result of the alarming increase and devastating impact of the pandemic on individuals, communities and society (Van Rensburg *et al.,* 2002); increasing food insecurity, as there are indications that food insecurity provides the context for HIV and AIDS pandemic, which exacerbates poverty. The poorest households are therefore more likely to feel the pandemic's greatest impact, resulting in increases in the extent, depth and distribution of poverty.

Between 1988 and 1996 there was a 25.1% decline in overall employment on farms in South Africa (Statistics South Africa, 2000). Regular jobs on farms declined by 15.7% over the period, from 724 000 to 610 000; while casual employment declined by 38%, from 495 000 to 304 000. A case study conducted

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by the Department of Agriculture in 1999 showed a reduction of 7.6% of regular employment in the agricultural sector between 1994/95 and 1998/99, an almost 2% decline per year over the period (Statistics South Africa, 2000). Declining employment is compounded by the fact that the agricultural sector with a few exceptions has the worst employment conditions, with workers rights being constantly violated.

Hall et al., (2001) contended that every farm worker's income supports another five people, and this ratio is probably higher in other developing countries. The impact of HIV/AIDS is likely to increase on the number of individuals in one household.

The full meaning of AIDS is "Acquired Immune Deficiency Syndrome". As the name implies it is a disease caused by a deficiency in the body's Immune system. It is a Syndrome because there are ranges of different symptoms, which are not always found in each case. It is acquired because AIDS is an infectious disease caused by a virus, which is spread, from person to person through a variety of routes. This makes it different from immune deficiency causes associated with use of anti-cancer drugs or immune system suppressing drugs given to persons receiving transplant operations (Hubley, 1995)

The topic is very sensitive. HIV/AIDS knows no colour, nor age, nor gender. It is more of the social problem than a mere health dilemma (Zwane *et al,* 1998), that is why former Zambian president Kenneth Kaunda at African development forum in Addis Ababa has uttered this statement "Let us strike back by declaring war, total war on HIV/AIDS not a national war that only appears in speeches at conferences and meetings, but a war that becomes part and parcel of the life of this continent" (Mutume, 2001).

HIV can be spread in three ways namely. Through unprotected vaginal, anal and (rarely) oral sex; by blood contaminated with HIV being passed directly into the

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bloodstream, particularly during a blood transfusion when unsterile needles are shared (e.g. between drugs users), or during unsterile medical procedures involving blood; and from mother to child during pregnancy, childbirth, and via breastfeeding (this is called 'vertical' or 'mother-to-child' transmission).

The debate about the origins of AIDS has not been helpful because it has created bitterness and diverted attention from the important task of AIDS prevention.

Unlike most of diseases, HIV/AIDS affects the most economically productive sector of the population: healthy, sexually active men and women. It is spreading with alarming rapidity in the rural areas, affecting people in their most productive years, the ages ranging from 15-45 (Baier1997).

Thus HIV/AIDS epidemic mainly affects that section of the population which agriculture depends on for labour and crop husbandry. The long period of progression from HIV to AIDS means that many people may be unaware that they have the disease and unknowingly pass it on to others. HIV/AIDS is a major problem for smallholder agriculture, the primary economic sector of most sub-Saharan Africa countries.

These smallholders are rural cultivators practising intensive, permanent, diversified agriculture on relatively small farms in areas of dense population. Smallholders have ownership or other well-defined tenure rights in lands that are long-term and often heritable. Not all food producers are smallholders. Smallholders practice intensive agriculture, producing relatively high annual or multicrop yields from permanent fields that are seldom or never rested, with fertility restored and sustained (Netting, 1993).

Smallholders usually share same characteristics of having farms that are typically small in average size, permanent in location and with high, continuous levels of

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production tend to occur in areas of dense rural population and they may serve both subsistence consumption and market demands.

Farming under the smallholder system is characterised by low level of production technology and small size of farm holdings of approximately 1,5 hectares per farmer; with production primarily for subsistence and little marketable surplus.

In South Africa the smallholder sector constitutes a major component of the agricultural industry and this sector provides livelihood for the majority of the rural population. In the past decade this sector has been affected by the HIV/AIDS pandemic although only few empirical data are available on the impact of HIV/AIDS on South African smallholder farming system. This study is therefore designed to provide an empirical database on the impact of HIV/AIDS on smallholder agriculture in Limpopo Province by focusing on Mopani district.

1.2. BACKGROUND INFORMATION ABOUT HIV/AIDS IN SOUTH AFRICA

South Africa is divided into nine provinces. These are: Kwazulu Natal, Mpumalanga, Free State, Northern Cape, Limpopo Province, North West, Eastern Cape, Western Cape and Gauteng. Each province is in turn made up of regions and districts. South Africa is considered to have the fastest growing HIV epidemic in the world with close to 50 000 people infected every month, and is currently experiencing high mortality and morbidity as a result of the HIV/AIDS epidemic (Zwane *et al*, 1998). Since the onset of the AIDS epidemic more than 500 000 South Africans have died of AIDS related causes and projection based on the current growth rate of HIV prevalence suggests that as many as 10 million may succumb over the next 15 years (Harsch, 2001).

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Table 1.1: HIV infection rates in various Provinces of Republic of South Africa for the year 2000 to 2002 (in percentage)

Province	2000	2001	2002
Western Cape	8,7	8,6	12.4
Northern Cape	11,2	15,9	15.1
Limpopo Province	13,2	14,5	15.6
Eastern Cape	20,2	21,7	23.6
North West	22,9	25,2	26.2
Free State	27,9	30,1	28.8
Gauteng Province	29,4	29,8	31.6
Mpumalanga	29,7	29,2	28.6
Kwazulu Natal	36,2	33,5	36.5

***Source**: Provincial Department of health and social development, Polokwane*

Table 1.1 summarises the HIV infection rates for various provinces of Republic of South Africa for the years 2000 to 2002. It can be observed from table 1 that the HIV infection rate for Limpopo province was estimated as 15.6% in year 2002.The provincial breakdown of this is shown in table1. 2.

1.3 BACKGROUND INFORMATION ABOUT HIV/AIDS IN LIMPOPO PROVINCE

Table 1.2: HIV Prevalence Rates in Various Districts of Limpopo by year 2002

DISTRICT	HIV Prevalence % (95%CI)
Bohlabela	12.72
Capricorn	13.89
Mopani	23.00
Sekhukhune	15.01
Vhembe	11.15
Waterberg	19.91
Provincial	15.56

***Source**: Provincial Department of health and social development, Polokwane*

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A close look at table1. 2 would reveal that Mopani District has the highest rate of HIV infection, which has been estimated as 23.0 % in 2002. Given such a high rate and the fact that most of the people in Mopani District live in rural areas and depend on agriculture, this study has selected Mopani District as the study area where the investigation of the economic impact of HIV/AIDS will be assessed with particularly focus on smallholder farmers in the district.

1.4 PROBLEM STATEMENT

Agriculture is one of the most important sectors in many developing countries, providing a living or survival mechanism for up to 80% of Limpopo province. Agriculture faces challenges including the issue of HIV/AIDS having a serious impact on the contribution of agriculture to gross domestic products (economic growth) of the country.

The major economic impact of HIV/AIDS on smallholder agriculture includes serious reduction of the amount of skilled labour and experience available, diversion of capital from agriculture, loss of farm and non-farm income and other psycho-social impacts that affect agricultural productivity (Mutangadura *et al*, 1999).

The high rate of HIV/AIDS infection in Africa (11.4%) poses enormous problems and challenges to the economic development of smallholder farmers. HIV/AIDS affects the most economically productive members of smallholder farmers and communities. High rate of HIV/AIDS infection calls for urgent need to assess the socio-economic impact of the epidemic. It is commonly agreed that HIV/AIDS have contributed to the depth of the problems faced by rural households (Mutangadura et al, 1999).

All dimensions of food security-availability, stability, access and use of food are affected where the prevalence of HIV/AIDS is high. It is argued that the

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devastating impact of HIV/AIDS, especially in the worst affected areas of Southern Africa, was complicating the task of fighting hunger and strengthening the livelihoods of the poor.

The epidemic is creating large new vulnerable groups. The United Nation (UN) has thus come to realize that although all food crises have long-term roots in uneven development, the fundamental difference in the 2002/2003 crises was the influence of HIV/AIDS-related morbidity and mortality, which both worsened and was exacerbated by the food crisis (Thindisa and Anim 2005). Most of the studies conducted to date have made a distinction between affected and not affected smallholder farmers/households with less effort to analyze deeper the differences between those who are affected by HIV/AIDS to enable more targeted policy responses.

HIV/AIDS can contribute to reduced productivity in terms of yields and agricultural output. For example in Zimbabwe, according to a survey conducted by the Zimbabwe farmer's union in 1997,agricultural output in communal areas declined by nearly 5% among households affected by AIDS in relation to household not affected by AIDS. Maize production by smallholder farmers and commercial farmers declined by 61% because of illness and death from AIDS while marketed output of cotton, vegetables, groundnut and sunflower were cut nearly in half; and cattle farming declined by almost a third (Kwaramba, 1997).

Women and men, young and old people expected to plough the land, tend the crops, harvest and store the produce are dying of Aids. Professional and technical staffs are not spared either. Resources that are supposed to be used for the welfare of the people and investment in agriculture are now being diverted into tending the sick, purchasing drugs and paying funeral expenses. Productive time is spent looking after the sick or attending funerals. As we are all aware, agriculture is an extremely time sensitive sector which requires that all operations are carried out on time. With the epidemic diverting their attention from making

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appropriate choice, people in rural areas have difficulty balancing social obligations and production activities and the consequence is low agricultural output (Mutangadura *et al*, 1999).

1.5. JUSTIFICATION FOR THE STUDY

Most of the existing literature on the impact of HIV/AIDS on agriculture in the African countries focuses on Tanzania, Zambia and Zimbabwe with very few or no major focus on South Africa. These studies present results which cannot be generalised neither for the particular country of focus nor for other countries within South African Development Community (SADC).

Again studies that focus on the South African conditions and household impact are infrequent. It has been estimated that there were approximately 519 000 smallholder farmers in Limpopo province by 1995 (Statistics South Africa, 1998 Report) and given the fact that 89 percent of the population of Limpopo province can be classified as rural, agriculture plays a major role in the economic growth and development of the province.

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Therefore there is a pressing need to improve the welfare of rural poor in Limpopo province, by focusing on the problems faced by smallholder farmers.

A major problem affecting smallholder agricultural production in Limpopo is the HIV/AIDS epidemic. Unfortunately very little is known about the impact of HIV/AIDS on smallholder agriculture in the province. This study is therefore designed to provide some empirical analysis of the impact of HIV/AIDS on smallholder agriculture in Mopani district of Limpopo Province.

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1.6. OBJECTIVES

The primary objective of the study is to assess the economic impact of HIV/AIDS on smallholder Agriculture in Mopani district of Limpopo province.

The specific objectives are as follows:

(a) To assess the impact of HIV/AIDS and other related socio-economic variables on agricultural labour (as the integral part of agriculture) among smallholder farmers in the four municipalities of Mopani district.

(b) To identify the coping strategy adopted by HIV/AIDS affected smallholder farmers to mitigate the impact of HIV/AIDS.

(c) To suggest appropriate policy recommendations to mitigate the impact of HIV/AIDS on smallholder agriculture.

1.7. RESEARCH HYPOTHESIS

The following hypothesis will be tested in the study:

HIV/AIDS and other related socio-economic variables have a negative impact on agricultural labour among smallholder farmers in the four municipalities of Mopani district of Limpopo province.

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1.8. ORGANISATION OF THE STUDY

The first chapter of this thesis presents an introduction to the study. The remainder of the thesis is organized into four chapters. In chapter 2 both the empirical and theoretical literature review are provided, chapter 3 deals with the scope and methodology of the study, chapter 4 presents the empirical results and analysis of the study and chapter 5 summarizes the study and discusses the major conclusion and policy recommendations.

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CHAPTER 2:

LITERATURE REVIEW

2.1. DEFINITION OF CONCEPT

Oni *et al* (2002) in their study of the economic impact of HIV/AIDS on rural households in Limpopo Province defined affected households as "those households that have suffered premature adult death and/or chronic illness associated with HIV/AIDS related conditions". A premature adult death was defined as "deaths amongst households' members under the age of 70 that could be linked to obvious HIV/AIDS related symptoms". Chronic illness was defined in terms of a person being chronically ill for at least the past thirty days prior to the survey, and an adult was defined as an individual aged 18 years or above."

2.2. HIV/AIDS AND RURAL LIVELIHOODS

Ncube (1999) identifies the major impacts of the epidemic on smallholder agriculture as: reduced land cultivation, poor management of farms (weeding, planting, and cultivating), loss of care of livestock and death of extension workers of about 15 % per year. He also recommends the following strategies: research on farm equipment's that sick farmers can use (Donkeys, ploughs, planters); the use of chemicals hoes and cultivators: scotch carts for harvesting; chemicals for dipping livestock; grazing schemes; introduction of milking techniques; potential irrigable lands and motorization of extension workers.

The paper by Muchunguzi (1999), entitled "the impact of HIV/AIDS on Smallholder Agriculture": the experience of muleba district, Tanzania, cites reduction in labour and investment in agriculture, loss of indigenous method/knowledge and deterioration of extension services as having major impact on smallholder agriculture. He identifies the main coping mechanisms as:

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changing types of crops grown, seeking off farm employment, exchanging labour for money and receiving support from the extended family.

Rugalema (1999), on his paper entitled "It is not only the loss of labour: HIV/AIDS, loss of household assets and household livelihood in Bukoba district, Tanzania," emphasised that not only is labour lost due to HIV/AIDS, but also there are losses of household assets and household livelihood. Drawing form a study he conducted in Bukoba district of Tanzania, he argues that the illness affects time allocation, puts pressure on children to work, and diverts household cash and the disposal of household productive assets.

HIV/AIDS therefore is an impoverishing process that leads to other problems such as malnutrition (especially for children), inaccessibility to health care, increased child mortality and hence intergenerational poverty (deprivation). These are some important issues in shaping rural development policies and interventions.

2.3. TECHNOLOGY DEVELOPMENT NEEDS OF SMALLHOLDER FARMERS

Richards (1999) stressed the broad context of agricultural change (both evolutionary and revolutionary) throughout African history that the farmers themselves have spearheaded. He also said that the impact of HIV/AIDS in rural societies could challenge farmers to carry out an African "precisions" agricultural revolution.

Richards argued that whether HIV/AIDS adapted agro-technological option become a reality depends largely on how much an effort is put in institutional reform to support agro-technical innovation. He said it also depends on willingness to create space for local social actors to develop informal institutions and avoid marginalizing the youth.

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The paper, by Gandiya (1999), entitled "some technological requirements for resource deprived households in the smallholder farming sector" argues for the development of technology in crop management, livestock management, storage and processing. Successful development and transfer of technology, however, requires the collaboration of different expertise and organisation (research scientist, nutritionist, economist's etc.) technologies also can be disseminated through existing institutions such as ministries, schools and farmer groups.

Mutangadura (1999) presents a strategic priority setting methodology to incorporate emerging constraints faced by smallholder farmers in the face of the epidemic. She also recommends that research institution should plan for AIDS in their strategic priorities so that HIV/AIDS does not undermine the performance of smallholder agriculture faced with labour and income constraints. Mutangadura also outlines a quantitative approach to agricultural research priority setting that facilitates the inclusion of multiple objectives.

2.4. POLICY AND INSTITUTIONAL RESPONSES TO HIV/AIDS

The paper by Kadonya (1999), entitled "Impact of HIV/AIDS on smallholder agriculture in Tanzania: rethinking some policy interventions", focuses on how HIV/AIDS affects household labour and income and what implications that has on policy interventions.

He recommended that policy, particularly agricultural policy, be re-examined to include the impact of HIV/AIDS on labour and income, that farm support services need strengthening to ensure that technical advice and credit are available, that appropriate technologies be developed to reduce the time spent on water and fuel collection and that income generating opportunities should be created to supplement agricultural income.

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Mbozi (1999) reviewed how the national agriculture information services, which provide radio services, and magazines for farmers and articles for national newspapers, did not address the HIV/AIDS in agriculture. He said smallholder farmers have less HIV/AIDS information or more knowledge gaps compared with their counter parts in urban areas where the HIV rates are now stable. Mbozi recommended raising HIV/AIDS awareness of journalists, allowing non-agricultural information on policy maker's agendas and developing HIV/Aids resource centres to strengthen journalist's HIV/AIDS reporting skills.

The paper by Mbonde and Tusekelege (1999) on "The role of NGO's in the mitigation of the impact of HIV/AIDS on smallholder agriculture" says that although many prevention and control NGO's are working at grassroots level, little information exists on how smallholder agriculture can be supported.

The HIV/AIDS interventions have not addressed the needs of smallholder farmers. Yet NGO's can play a major role in addressing these problems, if they actively involved the affected communities and agricultural extension services. To do this, however, the NGO's need the support and collaboration of governments and donor agencies. NGO's should work with target communities through community participation, empowering them to design and implement sustainable strategies.

"HIV/AIDS and the African Agrarian crisis: which way forward?" a paper by Barnett (1999), outlined the status of the epidemic in sub-Saharan Africa, the keys lessons learnt from research on the impact of HIV/AIDS on smallholder farmers in the region, and key directions for the future.

Barnett noted that African subsistence agriculture has already experienced other crisis, notably, from structural adjustment policy, food insecurity, changing the environment and the absence of a "green revolution" in the subsistence sector. Drawing from studies on HIV/AIDS and African subsistence/smallholder

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agriculture from 1989 t0 1997, Barnett showed that the work is surprisingly small and is hard to unravel none-AIDS and AIDS related impacts in relation to smallholder agriculture.

Some households cope effectively and others fare badly, depending on initial resources endowment. Some farming systems contract in areas of productivity and range because of labour shortages. Children head some households and patrilineal households are more robust than matrilineal. Barnett concluded that government must act now and that multi-sectorial responses are best. High quality research is still needed to answer outstanding questions such as the effects of the epidemic on socially reproductive labour.

Topouzis (2001) traced how HIV/AIDS affects the two subsectors, highlighting the loss of agricultural knowledge, skills and experiences an area of particular importance for training institutions and one that has received little attention to date. The article has argued that the multisectoral response concept needs to be redefined within a development context, in order to extend responses to HIV/AIDS beyond the health sector to the core technical areas of Agriculture and rural development.

It discusses the need for training institutions to go beyond health-oriented information, education and communication (IEC) HIV/AID components that are added on to existing programmes. Training strategies need to take into account the implications of this increase in young, adult morbidity and mortality and particularly, the loss of agricultural knowledge, skills and experience among the staff, as well as the target groups, and institutions.

FAO paper on, "Agriculture and HIV/AIDS", originally written in May 2001 at the request of EASE international in order to present a strategy for the agriculture in the areas of HIV/AIDS. The paper brings together the work done by FAO, which focused mostly on identifying the various impacts of HIV epidemic on Agriculture

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with work done by the South East Asia HIV and development project of UNDP (UNDP-SEA HIV) in the area of setting up rapid development responses to the epidemic.

The paper argued that agricultural sector should not attempt to carry out work for which it is ill equipped, but concentrate on activities in which it has a comparative advantage i.e. Agriculture. A simple model built along the lines of the early warning rapid response system (EWRRS) model, already published by the UNDP-SEAHIV, it identifies the key points of intervention for Agriculture policies and programmes at two levels: the farming and farm household systems.

The types of intervention of each are briefly discussed. The paper also showed how such activities dovetail with activities of the health sector. Some recommendations for the agricultural sector are made in order to assist it in initiating its interventions.

Gillespie *et al* (2001) outlined that one strategy for the agricultural sector in areas hit hard by HIV/AIDS is to reduce the amount of work necessary to raise crops. He also argued that for the majority of rural populations with high HIV prevalence in sub-Saharan Africa and elsewhere. Farming systems that are less dependent on labour will be more resilient to HIV/AIDS mobility and mortality, at least in the short term.

They also said HIV/AIDS has serious consequences for the commercial agricultural sector as well as for subsistence farmers. The commercial sector may depend on migrant labour, a group that is at high risk of exposure to HIV, especially if the labourer lives apart from their family. Conversely, the commercial sector could serve as a conduit for information and training on prevention, and might also provide opportunities for the youth to learn essential agricultural skills.

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Zwane *et al* (1998) on their paper Technology Needs of African Smallholders in Agriculture Responding to HIV/AIDS outlined that technology can help ease the burden of farmers affected by HIV/AIDS, but to be effective it must meet the following criteria: Affordability, Availability, Appropriateness and Compatibility with the cultural pattern of the intended beneficiaries.

Technologies that are not as labour intensive as present systems, but that allow similar levels of production with lower labour and direct energy inputs, need to be developed. Mechanical power sources will have to be modified drastically for the youth and elderly operating these machines.

Heavy equipment like hoes ploughs and planters need to be redesigned and plant crops will have to be selected and or genetically modified to compete with more weeds in the absence of weed control. Because the remaining population will find it increasingly difficult to use animal-based protein as a main source, bio-engineering will be required to improve the protein-production potential of plants. Animal traction systems using smaller, more docile animals like donkeys will have to be developed to replace large animals like oxen, which are difficult to handle.

Nyiramahoro *et al* (1999) Uganda AIDS and the household unit: Implication for farming systems Research and Rural Development a paper identifies the major impacts of HIV/AIDS on agricultural households in Uganda, including labour shortages resulting in longer working days, reduced yields, reduced food available, loss of income, poor nutrition and loss of specialized skills.

The paper also recommended that households adopt the following coping strategies: reduce area under cultivation, withdraw school children from school to attend to farm fields, shift from labour intensive crops and reduce the production of cash crops. Interventions include: modifying the hoe, generating income and capital creation measures, improving indigenous technologies such as mulching, intercropping and seed selection and drawing attention to social and cultural

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aspects of adoption through farming system research to take into account the impact of AIDS, rather than only concentrating on economic areas.

(Tulahi, 1999).In his paper on HIV/AIDS in Tanzania outlined that HIV/AIDS is increasingly becoming a social and developmental problem in Tanzania. If unchecked the rapid spread of AIDS epidemic is anticipated to have far reaching implications in the country over several decades to come.

The agricultural sector is likely to suffer significantly from the loss in labour and capital resulting from mortality and morbidity. This paper highlights to determinants of the spread s of AIDS and analyses the consequences of the epidemic on smallholder agricultural production. Massive deaths and morbidity lower labour productivity, resulting in declined agricultural production, agricultural earnings and food insecurity.

The disease also impacts on the performance of the extension workers, greatly reducing the availability of extension services to the smallholder agricultural sector. In communities where land is traditionally owned, women and children are likely to lose access to their land the death of the husband or the parents. Thus, the HIV/AIDS epidemic intensifies problems faced by the smallholder farmers, resulting in greatly reduced agricultural production.

Tulahi called on ministries of agriculture to increase the efficiency of their research, extension and training systems by focusing on developing and disseminating productivity enhancing technologies. Ministries of health and education need to improve rural health and education systems in collaboration with other agencies. At a regional level, Tulahi recommended making institutional arrangements for information exchange and motivating progress and development of strategies to solicit political commitment in addressing HIV/AIDS.

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Barnett and Blaikie (1992) in their research undertaken in the Rakai and Kabale districts of Uganda identified the effects of HIV/AIDS on households and farming systems. The research focused on the effects of labour losses and mapped the relative vulnerability of different farming systems. The research utilized small samples and an anthropological methodology.

The main conclusions were that:

- Some households would cope effectively while others would fare badly depending on initial endowments.
- Some farming systems would contract in areas cultivated productivity and range of crops because of labour shortages.
- The impact would be geographically concentrated and patchy.
- Some child-headed households were emerging (a finding not confirmed in other studies and, in the view of the World Bank, likely to be outcome for only 1% of AIDS affected households).

(Kinemo, 1999) in his study on "Commercial sex, HIV/AIDS and agriculture in Tanzania", argued that in Tanzania most of the people practice subsistence agriculture, which is organised around tribal and village groups with labour the major power source. Youths migrating to urban areas, particularly women, have spread HIV/AIDS in rural areas, resulting in loss of labour in smallholder agriculture.

Labour and land are the main factors of agricultural production in Tanzania. The infection rates of HIV/AIDS among adolescents and young women have affected the household labour base, traditional social security mechanisms and disposal of productive assets.

Kinemo described the major responses adopted to help alleviate the impacts of AIDS, and emphasises that the strategies and policies formulated so far have not been very effective, despite their good intentions. The efforts of the governmental

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and other parties, including NGO's, international organisations, etc have been directed towards the urban/non-agriculture areas, whereas the majority of the population live in rural areas. To some extent, this has resulted in a pronounced bias against smallholder agriculture and has had a negative impact on it. Kinemo recommended that legal measures be developed to curb the spread of HIV/AIDS in rural areas.

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CHAPTER 3

RESEARCH METHODOLOGY

It is very important to mention in the beginning that collecting data on HIV/AIDS from South African communities and relevant institutions like health institutions is sensitive and not easy. The stigma associated with the disease makes people unwilling to discuss or give AIDS related information, especially about family members. Even health staff does not disclose that one has died of HIV/AIDS or is suffering from AIDS unless the person is willing to do so.

To overcome this problem, respondents were be asked the HIV/AIDS questions indirectly (i.e. whether any member of their households have suffered premature adult death or chronic illness over the last three years. If yes, whether these are due to opportunistic diseases such as T.B, Pneumonia, etc.

3.1 STUDY AREA

The location of the study is Mopani district of Limpopo Province. The district is situated in the North Eastern part of the Limpopo Province, approximately 70 kilometres from Polokwane city. It is bordered in the east by Mozambique, in the north, by Zimbabwe and Vhembe District Municipality, in the south, by Mpumalanga province through Ehlanzeni District Municipality and to the west, by Capricorn District Municipality and in the South- west by Sekhukhune District Municipality.

It has been named Mopani because of abundance of nutritional Mopani worm found in the area. The district covers a land area of 2 242 183 ha (22 421.83km²). By virtue of the Kruger National Park as a District Management area, Mopani District is part of the Great Limpopo Transfrontier Park, the park that combines South Africa, Mozambique and Zimbabwe.

Source: Mopani District Integrated Development Plan, 2007/8

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The district comprises of five local municipalities, namely, greater Tzaneen, greater Giyani, greater Letaba, Ba-Phalaborwa and Maruleng. The study only focuses on four municipalities excluding Maruleng Municipality. The district borders Vhembe district on the west, Bohlabela district on the South and the neighbouring country Mozambique through Kruger National Park on the East. The estimated population of the district is presented in table 3.1.

Table 3.1: Estimated Population Distribution among the Municipalities in Mopani District (for year 2002)

Municipality	Estimated Population	Total Area	Wards
Ba-Phalaborwa	137 264	3004.88km²	14
Greater Giyani	276 668	2967,27km²	25
Greater Letaba	260 286	1891km²	23
Greater Tzaneen	442 282	3240km²	34
Total for Mopani District	1 223 747	22421.83km²	106

Source: Mopani District Integrated Development Plan, 2007/8

A close observation of table 3.1 reveals that the district had a total estimated population of 1 223 747 for the year 2006 (Mopani district IDP, 200/8). Greater Tzaneen municipality has the highest population with about 34 municipality wards.

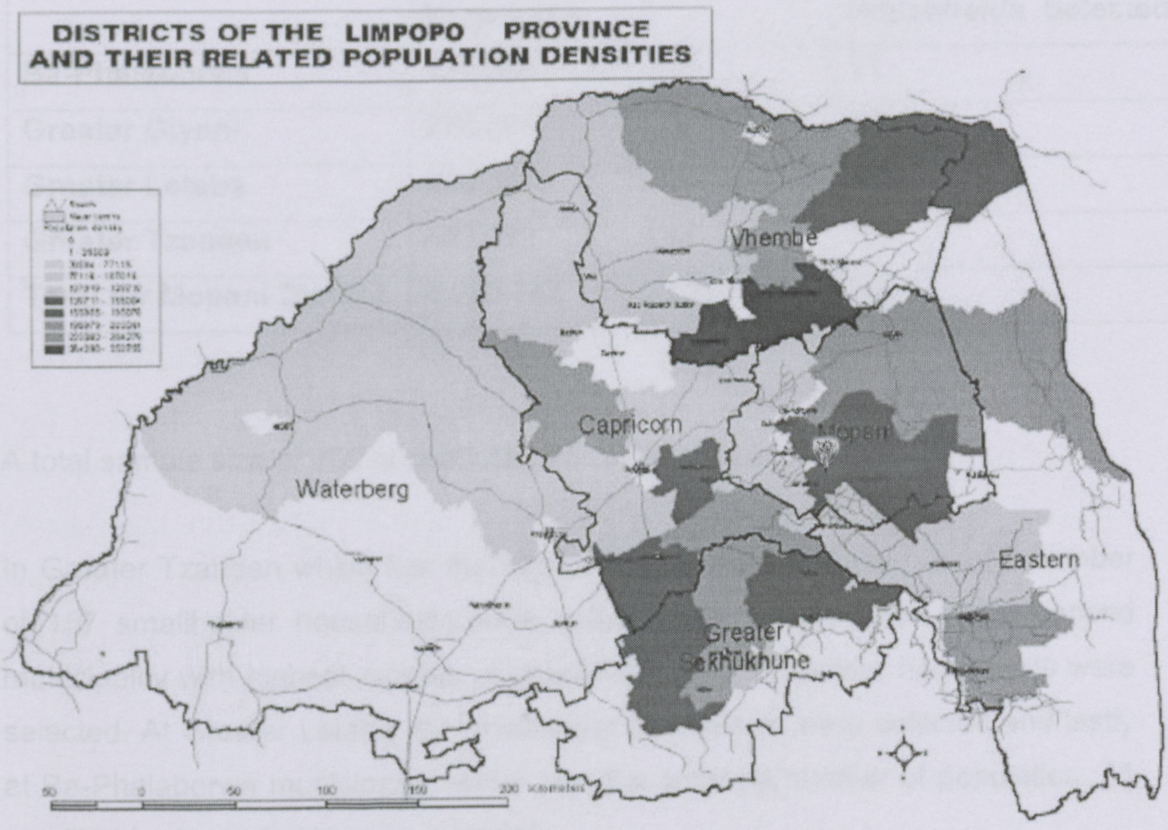
Greater Giyani has second largest population with about 25 municipality wards. Greater Letaba is third with a population figure of 260 286 with 23 municipality wards. Ba-Phalaborwa has the smallest population, with 14 municipality wards.

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Figure 3.1 below shows the districts of the Limpopo province and their Related Population Densities

DC36	Waterberg Municipality	District
DC35	Capricorn Municipality	District
DC34	Vhembe Municipality	District
DC33	**Mopani Municipality**	**District**
CBDC3	Sekhukhune Municipality	District



Source: www.limpopo.gov.za/about location.htm(2005).

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3.2 SAMPLE SELECTION

Probability sampling involving simple random selection of households in all four municipalities of Mopani district was carried out. The sample distribution per municipalities has been presented in table 3.2.

Table 3.2: Estimated Population and Sample Distribution per Municipality in Mopani District

Municipality	Estimated Population	Wards	Number of Smallholder Households Selected
Ba-Phalaborwa	137 264	14	51
Greater Giyani	276 668	25	100
Greater Letaba	260 286	23	92
Greater Tzaneen	442 282	34	157
Total for Mopani District	1 223 747	106	400

A total sample size of 400 households was selected as follows:

In Greater Tzaneen which has the highest number of population, a total number of 157 smallholder households were selected. At greater Giyani, the second municipality with highest number of population 100 smallholder households were selected. At Greater Letaba, 92 smallholder households were selected and lastly at Ba-Phalaborwa municipality, which has the smallest number of population, 51 smallholder households were selected.

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3.3 DATA COLLECTION

A cross-sectional rural household survey was carried out using a questionnaire to outline the general nature of questions to be asked. The questionnaire was designed to cover the following:

Identification of affected and unaffected households by asking questions that will include chronic illness, such as Tuberculosis and Pneumonia; and death of either family members or hired labourers. Questions about sources and quantity of labour supply, for example, how many households members are involved in farming, do they use hired labour? If yes, how many? Do they have labour supply problem? Identification of the common crops that are produced by the households, for example, maize and spinach and their quantity in kilogram per annum, and also whether over the past three years their quantity have increased or decreased, and reasons for that, also the size of their farm in hectares and whether cultivated or not and whether the farm size has changed over the past 3 years.

Identification of the livestock they keep, for example, poultry, donkeys and cattle and ask questions about the number of livestock kept per annum and whether this number has increased or decreased or they stayed constant over the last three years. Information on their sources of income; level of income and whether their incomes have increased, decreased or remained constant over the past three years and the reasons for this. Lastly information on household coping strategies to mitigate the impact of HIV/AIDS.

Three post matric students were recruited and trained in questionnaire administration and field interview techniques. The interviews and training of enumerators for the survey was conducted between January and March 2004. The village authorities were contacted before visiting and selecting the smallholder farmers for the survey in order to obtain the permission and also to discuss with them the objective of the study. Throughout the study, efforts were

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made to observe all legal and ethical requirements, and to maintain the confidentiality and anonymity of information collected from the respondents.

3.4 DATA CAPTURE AND ANALYSIS

Statistical Package for Social Science (SPSS) was used to capture and analyse the data collected from four municipalities in Mopani district of Limpopo province.

3.4.1. STATISTICAL PROCEDURES AND METHODS

The analytical techniques used to analyze data include descriptive statistics, correlation analysis; and ordinary least square regression analysis. Descriptive statistical analysis was used to determine the impact of HIV/AIDS and other related socio-economic variables on agricultural labour among smallholder farmers in four municipalities in Mopani district of Limpopo province.

The equation used for estimating the impact on household farm labour is specified as follows:

$$FLAI = b_0 + b_1 HMFE + b_2 TLA + b_3 PLAI + b_4 EIA + b_5 CFHL + b_6 TCI + b_7 TSNC + b_8 TSNG + b_9 TSNS + b_{10} TSNP + b_{11} TSNPO + b_{12} TSND + b_{13} AGE + b_{14} GEN + b_{15} MSHH + b_{16} HLEH + b_{17} OYD + b_{18} TYD + b_{19} NALHC + b_{20} NCLHC + b_{21} HED + b_{22} IYND + b_{23} MHSS + b_{24} IYNS + u$$

Where u is the stochastic error term accounting for the endogenous variables not included in the model but are likely to affect the exogenous variable. In general HIV/AIDS is expected to have a negative impact on smallholder farmers (EIA) and household farm labour (FLAI). The full description of the above specified variables is summarised in table 3.3. Ordinary least square regression analysis

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was applied using data obtained for the four municipalities and the results obtained are presented in chapter 4.

Table 3.3 DESCRIPTIONS OF VARIABLES IN THE REGRESION MODEL

Variable	Description	Units of measurement
Dependent Variable		
FLAI	Number of full-time labour	Number (Quantity)
Independent Variables		
HMFE	Experience of household in farming(1 if less than 1year; 2 if 2-5 years;3 if 6-10 years; and 4 if over 10 years	categorical
TLA	Total land area for farming	Number (in ha)
PLAI	Number of part-time labour involved in farming	Number (Quantity)
EIA	1 if household engaged in farming full-time and 2 if part-time.	Dummy
CFHL	1 if shift from cast to subsistence crop; 2 if shift from labour intensive crops;3 if reduce the size of farm to be cultivated and ;4 if other reasons	Categorical
TCI	Total crop income	Rand
TSNC	Number of cattle sold in 2003	Number (Quantity)
TSNG	Number of goat sold in 2003	Number (Quantity)
TSNS	Number of sheep sold in 2003	Number (Quantity)
TSNP	Number of pig sold in 2003	Number (Quantity)
TSNPO	Number of poultry sold in 2003	Number (Quantity)
TSND	Number of donkey sold in 2003	Number (Quantity)

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AGE	1 if less than 18; 2 if above 18 but less than/equal to 50;3 if 51 to 65 ;and 4 if above 65	Categorical
GEN	1 if gender of household is male; and 2 if female.	Dummy
MSHH	1 if marital status of household head is never married; 2 if married; 3 if divorced and 4 if widow	Categorical
HLEH	1 if the highest level of education for household head is none; 2 if primary education; 3 if secondary education and 4 if tertiary education.	Categorical
OYD	1 if the ownership of dwelling for household head is own; 2 if rent; 3 if lease; 4 if borrowed; 5 if share and 6 if other.	Categorical
TYD	1 if the type of dwelling for household head is formal house; 2 if traditional; 3 if shacks and 4 if single room	Categorical
NALHC	Number of adult living in your household	Number
NCLHC	Number of children living in your household	Number
HED	1 if household member experienced death in the past three years; 2 if not	Dummy
IYND	Number of death experienced by household	Number
MHSS	1 if household member suffered chronic illness and 2 if not	Dummy
IYNS	Number of people suffered from chronic illness	Number (Quantity

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CHAPTER 4

EMPERICAL RESULTS AND ANALYSIS

4.1 PRELIMINARY CONSIDERATION

This chapter presents and discusses the results of the impact of HIV/AIDS and other related socio-economic variables on agricultural labour among smallholder farmers in the four municipalities of Mopani district of Limpopo province. It also identifies the coping strategy adopted by HIV/AIDS affected households in mitigating the impact of HIV/AIDS.

HIV/AIDS affected households usually experience a reduction in the quality of labour in terms of reduction in economic returns per unit of labour. This occurs as households are forced to rely on low value-added activities such as casual labour and natural resource extraction. The quality of labour decreases as the number of sick members increases, which is a likely scenario for affected households due to infectious nature of the sexually transmitted disease (Thindisa and Anim, 2005).

The socio-economic impact of the HIV/AIDS exacerbates the vicious cycle of food insecurity and HIV/AIDS in which affected households are caught up. As adult members become ill and are forced to give up their jobs, household's income declines. To cope with the changes in income and the need to spend more on health care, children are often taken from school to assist in caring for the sick or to work so as to contribute to household income (Barnett and Whiteside, 2002).

Those that are living with or affected by chronic illness have less labour, spent time caring for others, and have decreasing experience and skills. It is widely recognized that HIV/AIDS increases the household's vulnerability since it slowly destroys the basic capacity to do things, by increasing the difficulty of going to work, cultivating fields, interacting socially, more generally, and implementing

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diverse livelihood strategies. In fact, HIV/AIDS attacks insidiously the core of the person's resilience. The consequences in terms of production deficit and decrease in earning are severe (Mutangadura, 1999)

Given the above consideration the results of this analysis are presented below.

4.2 RESULT OF REGRESSION MODEL

Given the fact that the objective of this study is to assess the impact of HIV/AIDS and other related socio-economic variables on agricultural labour among smallholder farmers in the four municipalities of Mopani district; the starting basis for our analysis is to estimate the means; the standard deviations and the levels of significance for each variable used in the regression model. Table 4.1 presents the estimates.

Table 4.1 Means and P-values for all variables included in the analysis

Variables	***Greater Tzaneen M1***	***Greater Giyani M2***	***Greater Letaba M3***	***Baphalaborwa M4***	***P-value***	***All Districts***
Dependent variable						
Number of family member working full time in the farm (FLAI)	1.64 (1.16)	4.19 (1.52)	2.88 (1.37)	3.20 (1.40)	0.033 **	2.92 (1.33)
Independent variables						
Experiences of household in farming (HMFE)	2.45 (0.82)	2.45 (0.83)	2.67 (0.99)	2.53 (0.73)	0.001 ***	2.51 (0.86)
Total land area for farming (TLA)	1.78 (1.19)	1.06 (0.89)	1.50 (0.90)	1.45 (0.99)		1.38 (1.10)
Number of part-time labour	3.66 (0.61)	3.06 (1.28)	2.98 (0.80)	3.47 (0.70)	0.030 **	3.39 (0.83)

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involved in the farm (PLAI)					0.384	
Extend to which household engaged in farming (EIA)	1.01 (0.80)	1.01 (0.10)	1.00 (0.00)	1.02 (0.14)	0.111 *	1.01 (0.86)
Strategy in dealing with labour loss (CFHL)	537.38 (309.43)	373.40 (337.92)	594.12 (298.44)	531.41 (341.23)		508.67 (327.61)
Total crop income (TCI)	310.19 (4350.08)	2375.00 (4322.98)	1732.07 (3569.17)	1842.16 (346.87)	0.060 **	1741.25 (4136.26)
Number of cattle sold in 2003 (TSNC)	0.70 (0.38)	0.17 (0.65)	0.02 (0.21)	0.02 (0.14)	0.002 ***	0.73 (0.41)
Number of goat sold in 2003(TSNG)	12.76 (159.62)	0.18 (0.70)	0.00 (0.00)	0.02 (0.14)	0.576	5.03 (99.99)
Number of sheep sold in 2003 (TSNS)	0.04 (0.34)	0.00 (0.00)	0.00 (0.00)	0.39 (0.20)	0.143 *	0.20 (0.22)
Number of pig sold in 2003 (TSNP)	0.02 (0.24)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.326	0.08 (0.15)
Number of poultry sold in 2003 (TSNPO)	0.03 (0.19)	0.25 (2.50)	0.00 (0.00)	0.20 (0.14)		0.01 (0.13)
Number of donkey sold in 2003 (TSND)	274.01 (1004.89)	559.25 (1165.52)	234.13 (723.98)	0.20 (0.14)	0.189 *	331.96 (955.61)
Age of the household head	1.01 (0.16)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	0.762	1.01 (0.10)

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(AGE)					0.002***	
Gender of the household head (GEN)	1.52 (0.50)	1.47 (0.50)	1.18 (0.39)	1.55 (0.50)		1.43 (0.50)
Marital status of the household head (MSHH)	2.92 (1.19)	2.98 (0.88)	2.54 (1.08)	3.31 (0.97)	0.627	2.90 (1.09)
Highest education level of the household head (HLEH)	3.03 (0.88)	3.00 (0.94)	3.40 (1.03)	3.35 (0.98)	0.789	3.15 (0.96)
Ownership of dwelling of the household (OYD)	3.62 (1.49)	3.36 (1.05)	2.92 (1.15)	3.71 (1.14)	0.222	3.41 (1.30)
Type of dwelling of the household (TYD)	2.67 (1.02)	2.74 (1.01)	2.92 (1.15)	2.90 (1.06)	0.084**	2.78 (1.03)
Number of adult in the household (NALHC)	1.70 (0.49)	1.71 (0.46)	1.63 (0.49)	1.78 (0.42)	0.425	1.53 (0.51)
Number of children in the household (NCLHC)	0.31 (0.52)	0.32 (0.53)	0.39 (0.53)	0.24 (0.47)	0.123*	0.76 (0.94)
Have you experienced death in the household (HED)	1.73 (0.45)	1.88 (0.33)	1.86 (0.35)	1.75 (0.44)	0.006***	1.80 (0.40)
Number death experienced household (IYND)	0.24 (0.46)	0.09 (0.29)	0.13 (0.37)	0.29 (0.54)	0.123	0.18 (0.42)

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Is there any household member suffering chronic illness (MHSS)	1.96 (0.21)	1.97 (0.17)	1.98 (0.15)	1.98 (0.14)	0.023 **	1.97 (0.18)
Number of people suffered from chronic illness (IYNS)	0.13 (0.71)	0.12 (0.62)	0.09 (0.59)	0.16 (0.78)	0.030 **	0.12 (0.67)
Number of cases (N)	***157***	***100***	***92***	***51***	0.021 **	***400***
					0.068 **	

*Standards deviation in brackets. Test of equality of group mean: P * < 0.1; P** < 0.05; P*** < 0.01; N = 400, M = Municipality*

The above reveals that on average each household had three (3) members working on full time basis at the farm. Households in Greater Giyani municipality had the highest number of four (4) working on full time basis on the farm; followed by households in both Greater Letaba and Baphalaborwa municipalities with three (3). And households in greater Tzaneen municipality with two (2). This variable (FLAI) was found to be significant at 5% level. The average total crop income was estimated as R1714.24 per season. Greater Giyani municipality had the highest total crop income of R2375.00, followed by Baphalaborwa municipality with total crop income of R1842.16 per household.

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Greater Letaba municipality was third with the total crop income of R1732.07 per household while Greater Tzaneen municipality had the least total crop income of R310.19 per household. The total crop income was found to be a is a significant variable in assessing the impact of HIV/AIDS on the number of family members working on the farm on the full time basis.

This income variable was significant at 5% level and it was positively correlated with the number of family members working in the farm on the full time basis; in the sense when the total crop income increases, the number of family members working in the farm on the full time basis will also increase. On the other hand the income was negatively correlated with the affected household (HIV/AIDS positive group) on the basis that when household members were affected, the total crop income would decline.

The results also revealed that on average, the total area for farming (TLA) was estimated as one (1) hectare per household in four municipalities. Both Greater Tzaneen and Greater Letaba municipalities had the highest areas of two (2) hectares per household, while both Greater Giyani and Baphalaborwa municipalities had the least area of one hectare per household. The farm area variable was significant at five percent level and it was also positively correlated with the number of family members working on the farm on the full time basis.

In terms of death occurrence; on the average each household had lost two members over the past years and most of the households found it difficult to disclose HIV/ AIDS as causes of death.

The results also revealed that among four municipalities, two (2) members of each and every household were suffering from chronic diseases (MHSS). Due to the stigma attached to the HIV/AIDS; people were reluctant to indicate their HIV/AIDS status but they could indicate that they were suffering from chronic

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illness such as TB, Pneumonia, and Meningitis and etc., which are opportunistic diseases associated with HIV/ AIDS.

The above two variables (HED and MHSS) in this study are regarded as the ones key to affected households (HIV/AIDS positive household). HED and MHSS were found to be significant at (5%) five percent level; and they were negatively correlated with the number of family members working in the farm on the full time basis and agriculture as whole. This implies that the more people get affected, the less the household supply of labour and the lesser their contribution to agricultural production.

In general, HIV/AIDS status appers to have a significant negative impact on the number of household members working full time on the farm. Estimated coefficients for variables associated with HIV/AIDS (HED and MHSS) were all significant at five percent level. The higher the number of household members affected, the lower the number of household members working full time on the farm and the lower the production.

The above result also indicates that households affected by HIV/AIDS suffered loss of farm labour, due to sick household members who could not work on the farm. This confirms that shortage of farm labour leads to a reduction of farming operations and loss of total household production and income. (FAO, 1996)

In all the four municipalities, the variable 'experiences of household in farming' (HMFE) appears to have a negative and significant impact on household farm labour. It is significant at 1% percent level. On average in each household, three (3) household members worked on part time basis on the farm. Households in both Greater Letaba and Baphalaborwa municipality had the highest number of three (3) household members working on part time basis on the farm, followed by households in both Greater Giyani and Greater Tzaneen municipalities with two (2) .

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The variable 'Household experienced difficulty in paying for health care' was not used as a constraint variable since the study was conducted in the rural area from those four municipalities namely Greater Tzaneen, Greater Giyani, Greater Letaba and Baphalaborwa. According to the number of studies, paying for health facilities in the rural areas is always a problem. Oni et al (2002), found that due to loss of total household income, households found it difficult to pay for health services.

However, the results of this study indicate that households dealing with the labour loss (CFHL) due to HIV/AIDS were on the average spending about R508. 67 per household. Greater Letaba municipality spent the highest amount of R594.12; followed in Greater Tzaneen municipality with R537.38, and Ba-Phalaborwa R531.41 while Greater Giyani municipality had the least amount of R373.40 per household.

The amount (R508.67) indicated above is the estimated value, since some households dealt with a loss of family or hired labour by shifting from cash to subsistence crops or by shifting from labour-intensive crops to labour- saving crops or by reducing the size of farm to be cultivated. The variable 'Strategy in dealing with labour loss (CFHL)' was found to be significant at five percent level and negatively correlated with the agricultural operations and the supply of labour.

The estimated values for variables such as Number of cattle sold in 2003 (TSNC), Number of goats sold in 2003(TSNG), Number of sheep sold in 2003 (TSNS), Number of pig sold in 2003 (TSNP), Number of poultry sold in 2003 (TSNPO) and Number of donkey sold in 2003 (TSND) provided an indication that household members found it difficult to finance the health services since they had to sell their livestock's. This affected their agricultural operations negatively since households used the farm income "which were supposed to be used to finance agricultural inputs" for medical care purposes.

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On average, the descriptive result revealed that each household in four municipalities sold one (1) cattle; five (5) goats; above thirty (30) donkeys, few poultry; few sheep and few pigs per season. Poultry; sheep and pig were few due to some cultural constraint.

Some of the socio- economic variables such as Age of the household head (AGE), Gender of the household head (GEN, Marital status of the household head and etc (MSHH) were found not to be significant; whereas others such as highest education level of the household head (HLEH), Number of adult in the household (NALHC) were found to be significant to the agricultural operations and on number of household members working full time on the farm (household Supply of labour to the farm).

Table 4.2 OLS regression results (Estimated coefficients for OLS regression equations.)

Variables	***Greater Tzaneen M1***	***Greater Giyani M2***	***Greater Letaba M3***	***Baphalaborwa M4***	***All***
Dependent variable *Number of family member working full time in the farm (FLAI)*	-	-	-	-	-
Independent variables *Experiences of household in farming (HMFE)*	0.45 (0.82)	0.63 (0.83)	0.67 (9.09)	0.53 (7.31)	0.51 (8.46)***
Total land area for farming (TLA)	1.72 (0.99)	3.06 (1.89)	2.53 (1.20)	2.45 (1.23)	2.78 (1.67)**
Number of part-	-3.36	-3.66	-2.78	-3.37	-3.39

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time labour involved in the farm (PLAI)	(-11.61)	(-15.28)	(-10.80)	(-9.20)	(-9.93)
Strategy in dealing with labour loss (CFHL)	3.38 (1.43)	3.40 (1.92)	4.12 (1.44)	3.41 (1.23)	3.67 (1.61)**
Total crop income (TCI)	3.19 (2.08)	3.00 (2.98)	3.07 (1.17)	2.16 (1.87)	3.25 (1.26)***
Number of cattle sold in 2003 (TSNC)	-0.10 (-0.03)	-0.13 (-0.60)	-0.22 (-0.25)	-0.32 (-0.06)	-0.33 (-0.41)
Number of goat sold in 2003(TSNG)	-4.76 (-1.62)	-1.18 (-0.60)	-1.00 (-0.30)	-1.02 (-0.54)	-2.03 (-9.92)*
Number of sheep sold in 2003 (TSNS)	-0.14 (-0.04)	-0.03 (-0.05)	-0.20 (-0.43)	-0.09 (-0.23)	-0.43 (-0.32)
Number of pig sold in 2003 (TSNP)	-0.01 (-0.20)	-0.02 (-0.20)	-0.02 (-0.40)	-0.03 (-0.30)	-0.48 (-0.15)*
Number of poultry sold in 2003 (TSNPO)	-0.33 (-0.09)	-0.25 (-0.05)	-0.06 (-0.60)	-0.22 (-0.14)	-0.31 (-0.03)
Number of donkey sold in 2003 (TSND)	-4.01 (-14.89)	-5.25 (-11.52)	-4.13 (-7.98)	-0.20 (-0.14)	-3.96 (-10.61)***
Number of adult	2.71	2.67	2.83	2.87	

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in the household (NALHC)	(0.59)	(0.56)	(0.69)	(0.72)	2.53 (6.51)***
Number of children in the household (NCLHC)	0.33 (0.02)	0.37 (0.03)	0.35 (0.03)	0.23 (0.07)	0.76 (0.74)*
Have you experienced death in the household (HED)	-1.67 (-0.55)	-1.78 (-0.53)	-1.66 (-0.35)	-1.65 (-0.54)	-1.88 (-0.40)**
Number death experienced household (IYND)	-1.83 (-0.66)	-1.79 (-0.29)	-1.13 (-0.77)	-1.19 (-0.54)	-1.68 (-0.42)**
Is there a household member suffering chronic illness (MHSS)	-2.96 (-0.51)	-2.97 (-0.57)	-2.98 (-0.55)	-2.98 (-0.54)	-2.97 (-0.58)**
Number of people suffered from chronic illness (IYNS)	-1.13 (-0.61)	-1.12 (-0.52)	-1.19 (-0.59)	-1.16 (-0.68)	-0.12 (-0.57)**
Number of cases (N)	***157***	***100***	***92***	***51***	***400***
Model statistics					
R Square	*0.73*	*0.82*	*0.78*	*0.81*	*0.77*
Adjusted R Square	*0.71*	*0.78*	*0.75*	*0.77*	*0.75*

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*t-values in brackets: P * < 0.1; P** < 0.05; P*** < 0.01; N = 400, M = Municipality*
P represents the level of significant.

The regression results presented in table 4.2 reveals that adjusted R^2 values was estimated to vary from .71 to .78 which means that the different variables used in the model were able to explain between 71% and 78% of the total variation in Number of family member working full time in the farm (FLAI) by smallholder farmers in the four municipalities.

Mushunje and Belete (2001), said that an adjusted R^2 of 0.54 is a fairly good result for regression of cross-sectional data. hence, the adjusted multiple coefficients of determinations (R^2) indicated in table 4.2 are quite satisfactory.

The regression results also revealed that variables such as Experiences of household in farming (HMFE), Total land area for farming (TLA), Strategy in dealing with labour loss (CFHL), Total crop income (TCI), Number of adult in the household (NALHC) and Number of children in the household (NCLHC) have a positive significant impact on the number of household members working full time basis on the farm.

However, experiences of household in farming (HMFE), total land area for farming (TLA) and number of adult in the household (NALHC) appear to make the highest contribution to the number of household members working full time basis on the farm. The bigger the size land for farming, the higher the number of household members working full time on the farm needed to cultivate the land area. The remaining variables on table 4.2 depict a negative significant impact on the number of household members working full time on the farm.

The variable 'number of family member working full time in the farm (FLAI)' was chosen to be a dependent variable because labour is regarded as an the integral part of farming and the most important factor affected by HIV/AIDS with respect to smallholder farm production.

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4.3 COPING STRATEGIES ADOPTED BY AFFECTED HOUSEHOLDS

The results of the responses on coping strategies are presented in figure 4.1

Figure 4.1 Coping strategies adopted by affected households

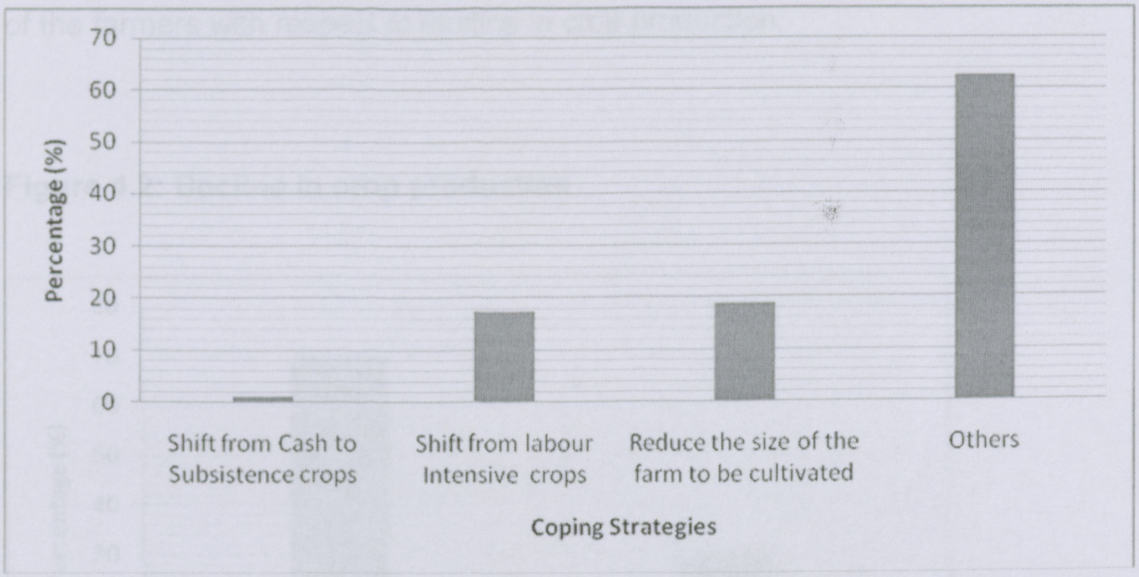


Figure 4.1 indicates that majority of the households did not want to specify what kind of strategy they were using in order for them to cope with the loss of either their family or hired labour, while most of them said they reduced the size of farm to be cultivated others said they shifted from labour intensive crops to less labour demanding crops.

Out of four hundred (400) smallholder farmers (householders), two hundred and fifty (250) or 63% smallholder farmers used variety of strategies in dealing with the loss of household members; seventy five (75) smallholder farmers or about 19% reduced the size of their farms; while seventy (70) smallholder farmers or about 17.5% have moved from labour intensive crops to labour saving crops; and

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finally on five (5) households or 0.25% moved from cash crop to subsistence farming.

4.4 IMPACT OF HIV/AIDS ON CROP PRODUCTION

One major impact of HIV/AIDS is the decline in farm crop production among smallholder farmers. Figure 4.2 has been presented to summarise the responses of the farmers with respect to decline in crop production.

Figure 4.2: Decline in crop production

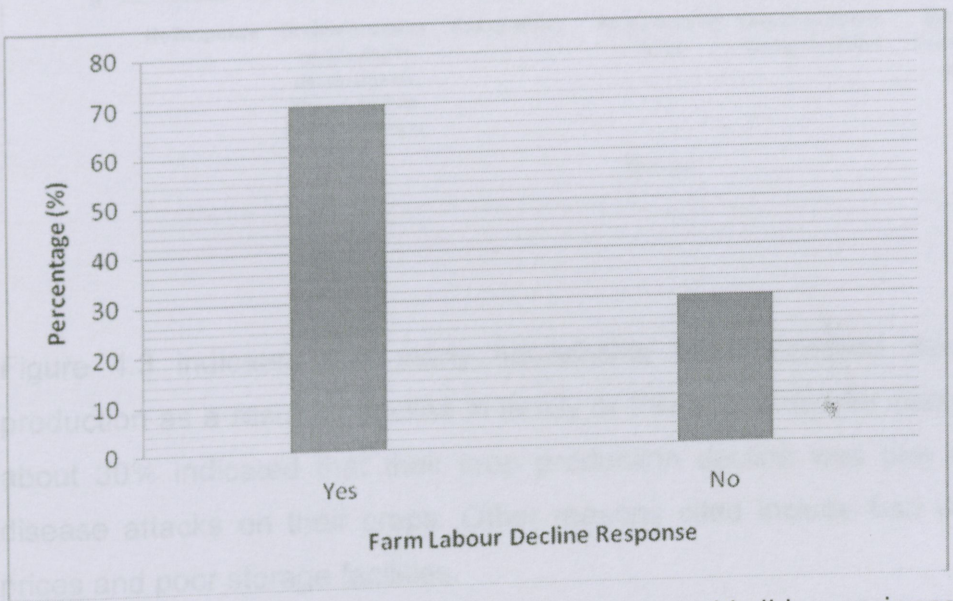


Figure 4.2 indicates that majority of the household did experience reduction in their crop production. This implies that out of four hundreds (400) smallholder farmers, two hundred and eighty (280) or 70% smallholder farmers have experienced a decline in crop production due to different reasons whereas one hundred and twenty (120) or 30% did not. These clearly indicate that the loss of household members negatively impacted on crop production among the affected households. The reasons for the decline are summarised in figure 4.3 below

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Figure 4.3 Reasons for decline in crop production

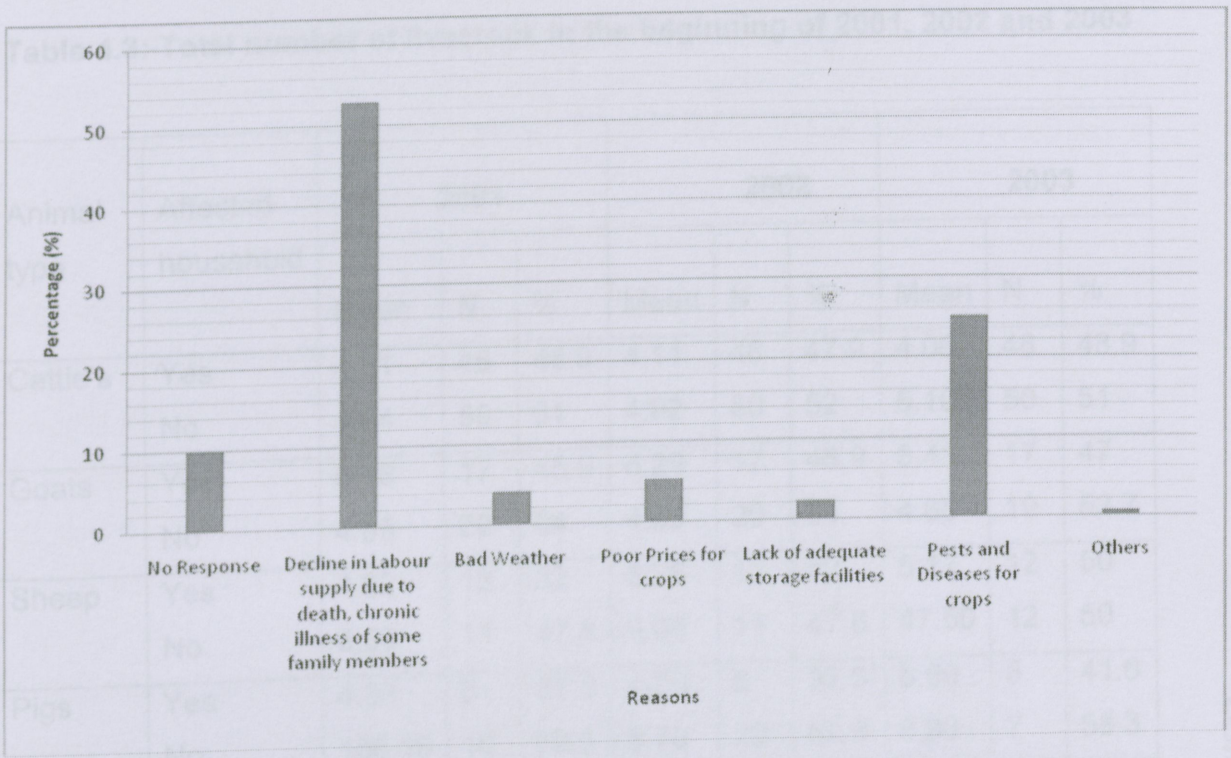


Figure 4.3 indicates that many households have identified decline in crop production as a result of decline in family or this accounted for about 65%, while about 30% indicated that their crop production decline was due to pests and disease attacks on their crops. Other reasons cited include bad weather, poor prices and poor storage facilities.

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4.5. IMPACT OF HIV/AIDS ON LIVESTOCK PRODUCTION

Table 4.3: Total number of livestock in the beginning of 2001, 2002 and 2003

Animal type	Affected household	2001			2002			2003		
		Mean	N	%	Mean	N	%	Mean	N	%
Cattle's	Yes	4.31	48	48.9	4.11	46	47.9	4.06	48	48.9
	No	4.84	50	51	4.92	50	52	5.10	50	51
Goats	Yes	6.18	17	45.9	6.29	17	45.9	6.41	17	47
	No	4.85	20	54	4.95	20	54	4.68	19	52.7
Sheep	Yes	4.92	12	52	5.25	12	52	5.17	12	50
	No	6.36	11	47.8	6.00	11	47.8	47.50	12	50
Pigs	Yes	4.33	6	37.5	4.50	6	37.5	6.60	5	41.6
	No	186.10	10	62.5	6.70	10	62.5	5.86	7	58.3
Poultry	Yes	0.20	74	45.6	1.44	9	60	5.00	10	35.7
	No	0.93	87	53.7	9.00	6	40	3.47	17	60.7
Donkeys	Yes	5.86	7	58.3	4.57	7	58	3.78	9	56.2
	No	4.80	5	41.6	5.40	5	41.6	3.71	7	43.7

Table 4.3 shows the number of different species of livestock owned by households affected and unaffected by HIV/AIDS. The table reveals that the number of livestock likes cattle and Donkeys owned by affected households declined between 2001 and 2003. The average number of cattle declined from 4.31 to 4.06 for the period between 2001 and 2003. The table also shows that the average number of cattle and sheep owned by affected household were smaller than those owned by unaffected households.

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HIV/AIDS affected households also experienced a reduction in labour productivity in terms of reduction in economic returns per unit of labour. This occurred as households were forced to rely on low value-added activities such as casual labour and natural resource extraction. The quantity of labour as well as the productivity of labour declined as the number of sick members' increased, as a result of the HIV/AIDS pandemic.

The socio-economic impact of the HIV/AIDS has also exacerbated the vicious cycle of food insecurity in which the HIV/AIDS in which affected households were caught up. As adults members became ill and were forced to give up their jobs, household's income declined. To cope with the changes in income and the need to spend on health care, children were often taken from school to assist in caring for the sick or work so as to contribute to household income.

In summary, those that were living with or affected by chronic diseases had less labour and spent more time caring for others, and they had less time for farm operations. It was also noted by some households affected by HIV/AIDS had increased vulnerability since the illness slowly destroyed their basic capacity to do things, by increasing the difficulty of going to work, cultivating fields, interacting socially, more generally, and implementing diverse livelihood strategies.

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CHAPTER 5

SUMMARY OF MAJOR FINDINGS; POLICY RECOMMENDATIONS AND CONCLUSION

5.1 SUMMARY OF MAJOR FINDINGS

This study has attempted to go beyond the official statistics and the general literature to capture information on the economic impact of HIV/AIDS on smallholder Agriculture in Mopani district of Limpopo province. The four (4) municipalities of Mopani district namely: Greater Tzaneen, Greater Giyani, Greater Letaba and Baphalaborwa, were selected for conducting the study.

One hundred and fifty seven (157) smallholders' farmers (households) in Greater Tzaneen municipality, one (100) hundred smallholders' farmers in Greater Giyani, ninety two (92) smallholders' farmers in Greater Letaba and fifty one (51) smallholders' farmers in Baphalaborwa were randomly selected to make a total sample size of four hundred (400).

This study was conducted using a structured questionnaire aimed at capturing the information on the different crops, livestock and the socio-economic factors limiting the agricultural operations including HIV/AIDS.

The objective of the study was to assess the impact of HIV/AIDS and other related socio-economic variables on agricultural labour (as the integral part of agriculture) among smallholder farmers in the four municipalities of Mopani district of Limpopo province and to identify the coping strategy adopted by HIV/AIDS affected smallholder farmers in mitigating the impact of HIV/AIDS.

The analytical techniques used include descriptive statistics, correlation analysis and ordinary least square regression analysis. Descriptive statistical analysis was also used to determine the impact of HIV/AIDS and other related socio-economic

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variables on agricultural labour among smallholder farmers in the four municipalities of Mopani district of Limpopo province.

The findings of this study reveal that, HIV/AIDS has a negative impact on the smallholder farmers in four municipalities namely: Greater Tzaneen, Greater Giyani, Greater Letabe and Baphalaborwa. In terms of labour; HIV/AIDS resulted in decline in farm labour due to death of household members and chronic diseases suffered by different household's members. The decline in farm labour following HIV/AIDS has resulted in decline in crop production; crop income and decline in livestock kept by smallholders and the general consequences of HIV/AIDS are the reduction in farm production and farm income. The coping strategies adopted by smallholders include shift from labour intensive crops to labour saving crops; reduction in farm area cultivated; and movement from cash crop to subsistence production.

HIV/AIDS also reduces the working hours among caregivers who divert away from income earning activities on the farm to care for ill household members. HIV/AIDS affected households were found to experience a reduction in economic returns per unit of labour input.

With the advent of HIV/AIDS; the affected households suffered loss of total household farm income because of the loss of other factors of production such as household farm labour, reduction in the farming area and a shift from cash crops to subsistent crops. Affected households also suffered loss of income when members became too ill to work or died from HIV/AIDS related causes.

The findings from the descriptive statistics revealed that on the average two (2) members in each household from four municipalities had died over the past 3 to 5 years. Some of the deaths were due to HIV/AIDS although most of the households found it difficult to disclose such information.

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The results also revealed that among the four municipalities, on the average two members of each affected household were currently suffering chronic diseases (MHSS). Due to the social stigma attached to the HIV/AIDS; people tend to hide their HIV/AIDS status but they could indicate that they were suffering from such chronic diseases such as TB, Pneumonia, and Meningitis and etc., which are opportunistic diseases associated with HIV/AIDS.

In general, HIV/AIDS status appears to have a significant negative impact on the number of household members working full time on the farm. Estimated coefficients for variables associated with HIV/AIDS (HED and MHSS) are all significant at five percent level. The higher the number of household members affected, the lower the number of household members working full time on the farm and the lower the farm production and farm income.

The estimations of the four municipalities resulted in adjusted R^2 values varying from 0.71 and 0.78, which means that the different variables used in the model were able to explain between 71% and 78% of the total variation in Number of family member working full time on the farms (FLAI) of smallholder farmers in the four municipalities.

The regression results further revealed that variables such as Experiences of household in farming (HMFE), total land area for farming (TLA), strategy in dealing with labour loss (CFHL), total crop income (TCI), number of adults in the household (NALHC) and number of children in the household (NCLHC) have positive significant impacts on the number of household members working full time on the farm.

Experiences of household in farming (HMFE), total land area for farming (TLA) and number of adult in the households (NALHC) appear to have the highest contribution on the number of household members working full time on the farm.

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The bigger the size land for farming, the higher the number of household members working full time on the farm.

5.2 POLICY RECOMMENDATIONS AND CONCLUSION

The findings of this study suggest that the need to develop and promote appropriate life changing policy framework and mitigation programmes; to meet the urgent needy of smallholder farmers and households affected by HIV/AIDS.

Monitoring and evaluation of both coping and mitigation strategies among households and communities affected by HIV/AIDS are critical aspects requiring attention. There is a need to have appropriate monitoring and evaluation system in place to monitor such strategies. This should be carried out by the provincial department of Health and Social development.

The national agricultural policy should be re-examined to include the impact of HIV/AIDS on income; and farm production. Subsidized inputs should be provided to smallholder farmers to enable them to cope with their rising cost of production and the decline in their farm labour input. Also government should provide credit to smallholder farmers to enable them to increase their farm size and hire farm labour to expand their farm production.

The Agricultural information services should also include HIV/AIDS awareness campaign particularly stressing the need for prevention and necessary mitigation of the HIV/AIDS impact. There is also the need to develop labour saving technology that will assist farmers affected by HIV/AIDS; such technology should be affordable, available, and appropriate for their farm operations.

Lastly; there is a need to encourage and promote the generation of income for these smallholder households through non-agricultural enterprises. This is

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necessary to supplement their agricultural income which has been declining due to HIV/AIDS.

In conclusion this study has revealed that HIV/AIDS impacted negatively on affected smallholder farmers through a reduction in their farm labour and a decline in their cultivated farm area; decline in livestock and decline in farm income. The coping strategy has been a shift from some labour intensive crops cultivation to labour saving crops cultivation; decline in farming areas; and a shift from cash crops to subsistence cropping. Policy recommendations include the need for government to provide credit to support the farmers coupled with HIV/AIDS awareness campaign particularly in the rural areas of South Africa.

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APPENDIX

FIELD SURVEY QUESTIONNAIRE

RESEARCH TOPIC: Economic impact of HIV/AIDS on smallholder Agriculture in Mopani District

Enumerators Name	
Date of Interview	
Name of Village	
Name of Ward	
Name of Municipality	
Questionnaire no.	

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Section A: Biographic Information about household head or respondent

A.1. How long has the household head been living in this area?

Period	Code
Less than 1 year	1
1-2 years	2
2-5 years	3
Over 5 years	4

A.2. Please indicate the age household head

Age	
Less than 18	1
18-50	2
51-65	3
66 and above	4

A.3. Gender of household head

Male	1
Female	2

A.4. Marital Status of household head

Never Married	1
Married	2
Divorced	3
Widowed	4

A.5. Highest level of education attained by the household head

None	1
Primary	2
Secondary	3
Tertiary	4

A.6. (a) Please indicate ownership of your dwelling

Own	1
Rent	2

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(b) Please indicate your type of dwelling

Formal House	1
Traditional	2
Shack	3
Single room	4

Section B: Household Members Profile

B.1. Please indicate the total number of people living in your household as of today

Category	Number of people
Adult	
Children	

B.2. How many people were living in your household 2 years ago?

Category	Number of people
Adult	
Children	

B.3. Has your household experienced any death over the past two to three years?

Yes	1
No	2

B.4. If yes, indicate the number of deaths ☐

B.5. Has any member of your household suffered chronic illness such as TB, Pneumonia, Meningitis over the past 3 years?

Yes	1
No	2

B.6. If yes, How many? ☐

B.7. Has any one joined your household over the past two to three years?

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Yes	1
No	2

B.8. If yes, how many and from where

Category	New Born	New Spouse	Others
Number			
From			

** Kwazulu Natal	1
Gauteng	2
Mpumalanga	3
Limpopo	4
Free State	5
Western Cape	6
Eastern Cape	7
North West	8
Northern Cape	9

Section C: Household Employment and Income

C.1. Please indicate the type of employment for your household members.

Type	No. Of People
Agricultural employment	
Formal employment	
Informal employment	
Not working(Adults)	

C.2. Please indicate the sources of your household income?

Please tick as appropriate	
1. Employment	
2. Remittances from elsewhere	
3. Agricultural Sources (Crops and Livestock)	
4. Government Social Security Grants (Pensions, etc.)	
5. Other Sources	

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C.3. Please give us an estimate of your 2003 annual household income.

1. Agricultural income	R
2. Remittances from elsewhere	R
3. Formal Employment Income	R
4. Government Social Security Grants (Pensions, etc.)	R
5. Other Sources	R

C.4. What was your total household income generated for the year 2003?

Amount in R	Code
Less than R10 000-00	1
R10 000 – R20 000	2
Between R30 000 and R50 000	3
Over R50 000	4

C.5. Over the past 3 years, what has been the trend in your household income? Select only one option.

Decreasing	1
Increasing	2
Constant	3

C.6. Please give reasons for this change in household income.

Change in salary received	1
Change in Agricultural Revenues And Prices	2
Change in government social security payments	3
Others (specify)	4

Section D: Farming Experience and Agricultural Production

D.1. Are you or any member of your family engaged in farming?

Yes	1
No	2

D.2. If involved in agriculture indicate whether

Full-time	1

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Part-time	2

D.3. How many years of farming experience do you have?

Less than 1 year	1
2-5 years	2
5-10 years	3
Over 10 years	4

D.4. Please indicate below the total area of your farm land For the past 3 years

Item	2001	2002	2003
(a) Total Cultivated Area			
(b) Uncultivated Area (Ha)			
(c) Total Land Area			

D.5. Please indicate below your farm labour resources in terms of numbers of people involved in your farming activities for the year 2001, 2002 and 2003

Type of labour	Full-time			Part-time		
Family labour	**2001**	**2002**	**2003**	**2001**	**2002**	**2003**
a. Adult						
b. Children						
Hired labour						
a. Adult						
b. Children						

D.6. What reasons can you give for the changes in the number of people involved in your farming activities (farm labours) for the past 3 years.

☐ Rising wages for hired labour

☐ Decline in family or hired labour supply due to death of household members.

☐ Suffering of chronic illness such as T.B & Pneumonia by hired labour or members of household

☐ Lack of adequate income to hire farm labour.

☐ Others

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☐ No change

D.7. How do you cope with loss of your family or hired labour?

Shift from cash to subsistence crops	1
Shift from labour-intensive crops	2
Reduce the size of farm to be cultivated	3
Others (specify)	4

D.8. Indicate below details of crop production activities for the year 2001,2002 and 2003

Crop Production activities	**Crop Area Planted (in Ha**			**Crop Output Quantity (in Kg)**			**Crop Output Quantity (in Kg)**					
	2001	2002	2003	2001	2002	2003	Quantity in 2001 (kg)	Sale Value 2001 ®	Quantity in 2002 (kg)	Sale Value 2002 ®	Quantity in 2003 (Kg)	Sale Value 2003 ®
1. Maize												
2. Sorghum												
3. Spinach												
4. Beans												
5. Cabbage												
6. Nuts												
7. Other												

D.9. a. Did you experience any decline in crop production?

Yes	1
No	2

b. Please indicate reasons for the decline in crop production activities for the past 3 years.

☐ 1. Decline in family or hired labour supply due to death, chronic illness of some family members.

☐ 2. Decline in land availability

☐ 3. Bad Weather

☐ 4. Poor prices for crops

☐ 5. Lack of adequate storage facilities

☐ 6. Pests and diseases for crops

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☐ 7. Others

D.10. Please give us an estimate of your total crop income for the last 3 years

a) 2001 R _____
b) 2002 R _____
c) 2003 R _____

D.11. Also indicate below details of your livestock production activities for the year 2001, 2002 and 2003

Livestock Production Activities	Total in Beginning of 2001		Acquisition in 2001		Sale in 2001	
	No*	Value	No	Value	No	Value
1. Cattle						
2. Goats						
3. Sheep						
4. Pigs						
5. Poultry						
6. Donkeys						
7. Rabbits						
8. Others						

Livestock Production Activities	Total in Beginning of 2002		Acquisition in 2002		Sale in 2002		Total Beginning 2003		Acquisition 2003		Sale in 2003	
	No*	Value	No	Value	No	Value	No	Value	No	Value	No	Value**
1. Cattle												
2. Goats												
3. Sheep												
4. Pigs												
5. Poultry												
6. Donkeys												
7. Rabbits												
8. Others												

Numerical Number*
Rands **

D12 a. Did you experience any decline in livestock production?

Yes	1
No	2

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b. What reasons can you give for the decline in your livestock production activities over the last 3 years?

- ☐ 1. Decline in family or hired labour supply due to death
- ☐ 2. Chronic illness of some family members
- ☐ 3. Decline in land availability
- ☐ 4. Bad Weather
- ☐ 5. Poor prices for livestock products
- ☐ 6. Poor storage facilities
- ☐ 7. Livestock pests and diseases
- ☐ 8. Sale of livestock to meet funeral expenses
- ☐ 9. Others

D13. Please indicate your total livestock income over the past 3 years

Period	Livestock income in ®
2001	
2002	
2003	

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