Kwanalu Commercial Farmers' Perceptions of and Management Responses to the HIV/AIDS Pandemic

By

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Abstract

In South Africa commercial agriculture employs approximately 8.5% of the national workforce. Therefore, information about commercial farmers' perceptions of and management responses to the HIV/AIDS pandemic are likely to be of interest to policy makers and non-governmental organisations (NGOs) in the health sector, as well as practitioners in rural development and commercial agriculture. HIV/AIDS affects businesses such as commercial farms by decreasing productivity, increasing costs and therefore decreasing overall profitability. Farm business' responses to the challenges posed by HIV/AIDS may advantage or disadvantage farm workers. For example, farm workers are highly vulnerable to burden-shifting activities (practices which reduce the cost of HIV/AIDS to the employer, such as the outsourcing of low-skilled jobs). However, farm businesses may also play a substantial role (e.g., by providing formal adult education or access to clinics) in addressing the HIV/AIDS epidemic in rural commercial farming areas of KwaZulu-Natal and in South Africa generally.

This study presents an analysis of KwaZulu-Natal commercial farmers' perceptions of and management responses to the HIV/AIDS pandemic. This analysis identifies the farm, business and personal characteristics of the various respondents. It is important to know this information because it assists in understanding why commercial farmers are responding as they are, which will in turn assist in future HIV/AIDS policy planning. The analysis is based on a postal census survey of Kwanalu (KwaZulu-Natal Agricultural Union) commercial farmer members in April and May 2007. Results suggest that, on average, Kwanalu members are highly concerned about the impact of HIV/AIDS on their businesses. A majority of respondents perceived HIV/AIDS to negatively affect the current and future profitability of farming, increase labour absenteeism and staff turnover rates, and reduce labour productivity. An analysis of variance (ANOVA) of the data shows that respondents' management responses to the HIV/AIDS pandemic varied by farm size and enterprise type, but include paying higher than average wage rates to attract and retain healthy and productive workers, multi-skilling staff to provide back-up skills, and mechanisation to defer costs of HIV/AIDS. Respondents tended to believe that effective HIV/AIDS treatment and prevention programmes require an integrated approach between government, employers and employees.

Two response indexes were calculated: (1) ranking by adopters only (only those who use a certain response are included) and (2) ranking by all respondents (a response is not used by a respondent automatically scores zero). The response indexes showed that resource-intensive HIV/AIDS services such as provision of antiretrovirals (ARVs) and nutritional supplements are ranked high by actual adopters, but relatively low overall (as only a small proportion of respondents are adopting these strategies) in the ranking by all respondents. Burden-shifting practices (e.g. mechanisation) are ranked relatively high in both rankings, indicating that respondents rate them as important in managing HIV/AIDS, and that many respondents are utilising them. Relatively inexpensive HIV/AIDS services (e.g. informal communication) are ranked low by actual adopters but high on the overall index as many respondents are using them (but doubt their effectiveness).

A linear regression analysis was conducted on principal components from the response indexes to identify characteristics of "high" and "low" responders and of those who utilise burden shifting activities or HIV/AIDS services. The characteristics of "high" responders are that they perceive HIV/AIDS to impact on costs; they employ a high proportion of skilled labour; and they have high turnovers and high debt servicing obligations. Responders who employ large amounts of labour (particularly permanent labour); who perceive HIV/AIDS as the responsibility of the employer; who are older and more experienced; and who have a relatively high debt: asset ratio tend to use HIV/AIDS services to manage the impacts of HIV/AIDS. Many respondents already play an important but inexpensive role in HIV/AIDS prevention and treatment through encouraging voluntary HIV testing and providing staff with information and transport to clinics. Policy makers should take this into consideration when formulating HIV/AIDS policies to combat the pandemic.

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Introduction

HIV is the retrovirus which causes Acquired Immune Deficiency Syndrome (AIDS). AIDS is a terminal disease which suppresses the immune response and increases morbidity, and eventually leads to early mortality. Southern Africa has been and remains the epicentre of the global HIV/AIDS epidemic (UNAIDS/WHO, 2005). According to Dorrington *et al.* (2006), 5.3 million South Africans were living with HIV and there were 346 000 AIDS-related deaths in South Africa during 2005. The national prevalence rate of HIV in adults aged 20 - 64 during 2005 was estimated at 19.2%, but was highest in KwaZulu–Natal at 28% (Dorrington *et al.,* 2006). HIV/AIDS is categorised as an epidemic (Bloom & Mahal, 1997; Baruch & Clancy, 2000; Daly, 2000) and pandemic (Arndt & Lewis, 2001) in the literature and these two terms are used interchangeably. An epidemic is the fast spread of a disease in a particular area or among a certain population group. A pandemic is a worldwide epidemic (Global Health Reporting.Org, 2008).

Macroeconomic effects of HIV/AIDS have been modelled since the early 1990s. These early models were hindered by a lack of data on and poor understanding of the HIV/AIDS pandemic (Arndt & Lewis, 2000; McDonald & Roberts, 2005). Cuddington (1993a, 1993b, 1994) estimated the long-run effects of HIV/AIDS on the annual GDP per capita in Tanzania and Malawi. These studies estimated a drop of 0.25% in GDP per capita per year until 2010. A similar study conducted by Over (1992) found that more highly-educated classes have increased rates of infection. This study predicted a drop in GDP per capita by 0.15% to 0.33% per annum.

Cuddington (1993a, 1993b) found that AIDS increased morbidity and mortality in the workforce, which would lead to a decrease in the size of the workforce. A conclusion from both studies (Cuddington, 1993a, 1993b; Over, 1992) is that rising medical costs would be financed by private savings, leading to lower private and public savings, which in turn lowers investment and leads to slower rates of economic growth. Bloom and Mahal (1997) dispute these results by arguing that the existence of surplus labour will decrease output losses. Cuddington (1993b), however, found that surplus labour did not affect the results of the experiment.

Bloom and Mahal (1997) concluded from cross-country studies (on 51 developing and industrial countries) that HIV/AIDS would not decrease the growth rate of income per capita or slow the economic growth of a country. However, it was concluded that HIV/AIDS has a large negative impact on life expectancy and therefore on development (Bloom & Mahal, 1997). More recent research questions these results on grounds of data limitation (McDonald & Roberts, 2006). Bonnel (2000) conducted a cross-country study and concluded that the economic impact of HIV/AIDS would not be uniform across countries or within countries. The results indicated that Africa had an average HIV/AIDS prevalence rate of 8% in 1999 and this reduced GDP per capita by 0.7% per year (Bonnel, 2000). The macro implications for South Africa are substantial. Bonnel (2000) predicts that for a country with a 20% prevalence rate, the rate of growth of GDP would be "2.6 percentage points less each year" (Bonnel, 2000, 846) than in a no-AIDS scenario, and over a period of twenty years GDP per capita would be 67% lower than in a no-AIDS scenario. Arndt and Lewis (2000) support this finding using an economy-wide computable general equilibrium (CGE) model of South Africa. Smith (2004), using a Ramsey type model, found that a 10% decline in the size of the labour force would lead to an 11% drop in the long-run GDP of South Africa.

Research conducted at the micro or rural household level has increased in recent times, due to researchers taking into account the human capital aspect of HIV/AIDS (Greener *et al.*, 2000). Increased morbidity and mortality (as a result of HIV/AIDS) cause a substantial decrease in affected households' income and therefore lead to an increase in poverty (Greener *et al.*, 2000). As infected members of a household move from the HIV phase to the AIDS phase, morbidity increases and productivity – and therefore income – decreases. Households respond to the loss of income by using short-term strategies (Naidu & Harris, 2004). These strategies include financing medical costs and funerals from savings initially, followed by asset sales, borrowing, removing children from school, the return of retirees to work, and finally reliance on outside help (Sauerborn *et al.*, 1996; Mutungadura *et al.*, 1999). Over the long term the effect of these strategies will be severe if savings and assets are not replaced, as this decreases the potential for future investment, and if children are taken out school, future employment options are limited (Naidu & Harris, 2004). Children being taken out of school or being orphaned will cause a decline in the transfer of knowledge between two generations and decrease the future

productivity and earning potential of the children (Bell *et al*., 2006). Similarly, early death of the child represents a loss to the family of future resources. Bell *et al*. (2006), using the overlapping generations model, conclude that in the absence of policy intervention the economy would halve in four generations. Policy intervention is required at the household level, but Bell *et al*. (2006) estimate that this would cause a fiscal burden of 4% of GDP. Several FANPRN studies (Chaminuka *et al.,* 2006 and Mano and Matshe, 2006) have found the HIV/AIDS negatively affects food security in HIV/AIDS affected rural households in less developed agricultural regions of South Africa. However, they did not examine the link between labour employment in commercial agriculture and food security in these rural household.

There is a small but growing body of peer-reviewed literature on the impact of HIV/AIDS on business, although it is widely recognised that HIV/AIDS impacts on businesses negatively (Barnett & Whiteside, 2000; Daly, 2000; Morris *et al.,* 2000; Rosen & Simon, 2003; Rosen *et al.*, 2004; Connelly & Rosen, 2005). [1]. Two types of studies of the impact of HIV/AIDS on businesses in South Africa have been undertaken. The first is a case study approach where researchers estimate the actual cost of HIV/AIDS to a company (e.g. Morris *et al*., 2000; Rosen *et al*., 2004). The second approach focuses on management perceptions of HIV/AIDS, since perceptions affect responses (e.g. Connelly & Rosen, 2005; Ellis, 2006).

HIV/AIDS is directly linked to decreasing productivity, increasing production costs and therefore decreased profits (Daly, 2000). Profits will decrease with a decline in productivity and no simultaneous decline in production costs. HIV/AIDS will cause an increase in absenteeism, staff turnover, training costs, insurance cover, health management, funeral costs and general transaction costs (Daly, 2000). Morris et *al.* (2000) conducted a study on a cohort of male sugar mill workers over an eight year period. By the end of the study period 10.7% of the workforce had left through morbidity and mortality caused by HIV/AIDS. Only 58% of the infected workers remained in the workforce at the end of the study period. Morris *et al.* (2000) concluded that these factors caused a significant rise in production costs and that these costs would rise tenfold in the following six years.

[1] For examples refer to King's (2005) paper on AIDS in commercial agriculture in the Eastern Cape Province, and Weinand's (2007) paper on Agriculture and AIDS in Mpumalanga.

Businesses may respond to the impact of HIV/AIDS by providing their staff with various HIV/AIDS services that range from provision of information about HIV/AIDS to providing staff with antiretrovirals (ARVs). These pre-emptive management actions aim to ameliorate the detrimental impact of HIV/AIDS on their operational costs (Barnett & Whiteside, 2000; Daly, 2000; Morris *et al.,* 2000; Connelly & Rosen, 2005). Businesses can also engage in other HIV/AIDS management strategies that reduce the exposure of the business to HIV/AIDS (e.g. substituting labour with machinery), that shift the burden of HIV/AIDS to another party (e.g. outsourcing labour-intensive business activities), or that increase their capacity to bear the impacts of HIV/AIDS (e.g. multi-skilling staff to reduce the impact of increased staff absenteeism).

The Bureau of Economic Research (BER, Stellenbosch University) conducted a study on the perceptions of South African business towards HIV/AIDS over a period of three years. Several sectors were researched, including the manufacturing, trade, building and construction, financial services, mining and transport and storage sectors, and the survey included small, medium and large companies (Ellis, 2006). The BER survey collected information about firms' provision of HIV/AIDS services; monitoring of HIV/AIDS services provided; managers' perceptions of the effects of stigma and discrimination on HIV/AIDS service uptake by employees; how HIV/AIDS has affected the production side of the company; the company's demand for labour; fixed investment and company profits. Results showed that, on average, large companies are actively intervening while smaller companies are doing relatively little in terms of providing HIV/AIDS services (Ellis, 2006). Ellis (2006) concluded that the cost of providing HIV/AIDS services is less than the costs of doing nothing, and that it is important for companies to be proactive in the prevention of HIV/AIDS.

Commercial agriculture employs approximately 8.5% of the workforce in South Africa (Statistics South Africa, 2008). Farmers' demand for labour is derived from the demand for agricultural produce, and is therefore a function of the price of agricultural produce, the cost of labour, the price of all other inputs and the level of technology (Friedman, 1962). Farmers will, therefore, respond to increased actual and anticipated direct and indirect costs of labour (Sparrow *et al.*,

2008), including those attributable to HIV/AIDS. Sparrow *et al.*, (2008) estimated the own price elasticity of demand for farm labour in South Africa to be price elastic in the long run (-1.3).

Farm businesses' responses to the challenges posed by HIV/AIDS may advantage or disadvantage farm workers. For example, farm workers are highly vulnerable to burden-shifting activities (practices which reduce the cost of HIV/AIDS to the employer, such as the outsourcing of low-skilled jobs). However, farm businesses may also play a substantial role in addressing the HIV/AIDS epidemic in the rural commercial farming areas of KwaZulu-Natal and South Africa generally. For example, Non-governmental organisations (NGOs) in Mpumalanga have had some success in working with commercial farmers to spread awareness, encourage voluntary testing and counselling and improve access to health care services (Weinand, 2007).

AgriAids is an organization founded to raise the awareness of HIV/AIDS in the agricultural industry. AgriAids was selected by ComMark Trust to head a long-term intervention (LTI) plan. This intervention plan will be dedicated to addressing HIV/AIDS within the agricultural sector in South Africa. The aims of the intervention plan are to reduce HIV/AIDS infection rates and improve access to HIV/AIDS care and support. AgriAids appointed Ingelozi Management Solutions (IMS) to "carry out preliminary research and to facilitate a participatory process of developing a strategic plan based on local experience" (IMS, 2008 page 3). A report by IMS concluded that the current South African response to HIV/AIDS within the agricultural sector is extremely fragmented, *ad hoc* and under-resourced on both public and private levels, and that there is an urgent need for data collection, monitoring and evaluation of this response (IMS, 2008).

This study investigates KwaZulu-Natal Agricultural Union (Kwanalu) commercial farmer members' awareness of HIV/AIDS, their perceptions of the impacts of HIV/AIDS on their businesses, and their management responses to these perceived impacts. This research is based on an analysis of data collected in a cross-sectional census survey of Kwanalu farmers in 2007. Anecdotal information is also provided in support of arguments presented in the research (e.g. problems of securing antiretrovirals (ARVs) for workers from state clinics, problems of staff not heeding advice provided by management, etc.). A better understanding of farmers' awareness,

perceptions and responses will provide insight into policies and programmes that will better equip farm businesses to address HIV/AIDS in rural commercial farming regions. This dissertation is structured as follows: Chapter 1 focuses on the impact of HIV/AIDS in the workplace; Chapter 2 studies the response of business to HIV/AIDS; Chapter 3 presents the methodology used in similar studies and the conceptual models for this study; Chapter 4 discusses data collection and methodology; and Chapters 5 and 6 discuss the results of the study, which are followed by the conclusions and recommendations.

Chapter 1: The economic impact of HIV/AIDS in the workplace

The key concept of 'vulnerability' is reviewed in this chapter. The impact of HIV/AIDS in the workplace will be broken down into components and discussed in more detail with respect to farms and agribusiness in South Africa.

1.1 Key concept: vulnerability

'Vulnerability' in this case has to do with how HIV/AIDS will impact on an economic entity (e.g. a commercial farm) through morbidity and mortality (Barnett & Whiteside, 2000). This concept may also be applied at all levels. The highest rate of HIV/AIDS prevalence is found in the 15 - 49 age group in South Africa (UNAIDS, 2006). Commercial agricultural enterprises in South Africa, which employ many semi- or unskilled workers, may be vulnerable to HIV/AIDS. Therefore, an understanding of the specific impact of HIV/AIDS on a particular business is required for effective controls to be instituted (Daly, 2000). Daly (2000) identifies two key areas of impact in the workplace. These areas are decreasing productivity and increasing costs of production. An example of vulnerability is a labour-intensive enterprise which draws its labour from an area with a high HIV/AIDS prevalence rate.

1.2 The economic impact of HIV/AIDS on an enterprise

Figure 1.1 and Table 1.1 illustrate the economic impact of HIV/AIDS on the workplace. Declining productivity and increased production costs are a culmination of many factors related to morbidity and mortality caused by HIV/AIDS. The net effect of declining productivity and increased production costs is a decline in profit. Veenstra and Whiteside (2005) describe the impacts of HIV/AIDS on a business as a type of tax (as HIV/AIDS has cost consequences for HIV/AIDS vulnerable businesses). Van Wyk *et al.* (2004) consider the impact of HIV/AIDS as a determinant of long-term risk to a business. The impact of HIV/AIDS on business occurs over a long term from infection to mortality.

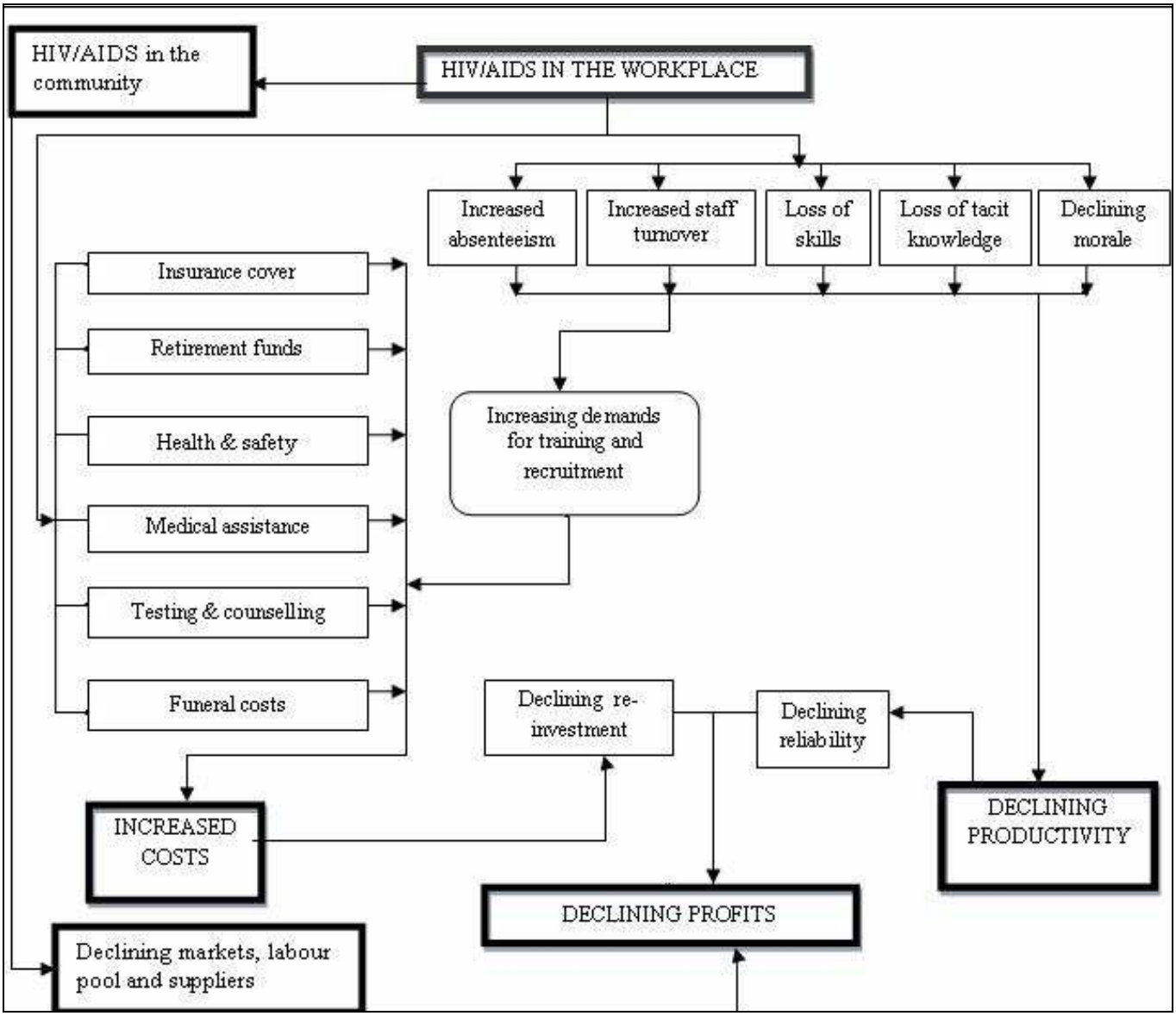

Figure 1.1 The impact of HIV/AIDS on the workplace.

Source: Adapted from Daly (2000)

Table 1.1 below indicates how the costs of HIV/AIDS are distributed over the period of the disease. This period may be up to 10 years but may vary depending on nutritional and treatment status. Costs are not incurred until a person has been infected for approximately seven years (Rosen *et al.,* 2003). The company then begins to incur sickness-related costs such as leave, absenteeism, productivity loss, supervisory time, medical care and accidents. Once the employee

dies, the company incurs end-of-service costs such as benefit payments and funeral costs. The company then hires a replacement employee and incurs costs of recruitment and training.

Table 1.1 The time frame for HIV/AIDS costs.

Time Frame (typical)	Progression of HIV/AIDS in the workforce	Current cost to the company	Liability acquired by the company
Year 0	Employee becomes infected with HIV.	Company incurs no cost at this stage.	Discounted sum of all costs from years 0 - 10+
Years 0 - 7	Employee feels healthy and is fully productive.	Company incurs no cost at this stage.	
Years 7 - 9	Illness begins. Employee may die in the first few years or remain free of illness for years.	Sickness-related costs are incurred (leave and absenteeism, productivity loss, supervisory time, medical care and accidents).	
Years 9 - 10	Employee dies or leaves the workforce due to disability.	End-of-service costs are incurred (benefits payments, funeral expenses, management time, depressed morale).	
Years 10+	Company hires a replacement employee.	Turnover costs are incurred (vacancy, recruitment, training, reduced productivity while replacement learns the job).	

Source: Rosen *et al.* (2003).

1.2.1 Declining productivity

Declining productivity, as shown in Figure 1.1, is a result of increased absenteeism, increased staff turnover, loss of skills, loss of tacit knowledge and a declining morale in the workforce (Daly, 2000). Depending on the type of enterprise, uncertain productivity (due to the effects of HIV/AIDS) can cause a reduction in the ability of the company to meet customer demand. This affects the reliability of the enterprise and has future implications for the sustainability of the company (Daly, 2000). Daly (2000) divides the factors responsible for declining productivity into two groups: increased absenteeism and increased organisational disruption. Ellis (2006) found that small, medium and large companies perceived HIV/AIDS to negatively impact productivity. However, small companies indicated a significantly lower impact than medium and large

companies. Three quarters of the companies surveyed by Ellis perceived that HIV/AIDS led to lower labour productivity, increased absenteeism and higher employee benefit costs (Ellis, 2006).

1.2.1.1 Increased absenteeism

AIDS causes absenteeism through increased morbidity from secondary infections, people staying home to care for sick members of the family and people attending funerals (UNAIDS, 1998; Daly, 2000). Absenteeism causes disrupts production, causes underutilisation of equipment and leads to the increased use of temporary staff (Daly, 2000). In Madras, India, industrial labour absenteeism due to AIDS was estimated to double from 1998 - 2000 (UNAIDS, 1998). A study by Morris *et al.* (2000) on a cohort of sugar mill workers in South Africa found that workers who left the workforce because of HIV/AIDS were absent from work for an average of 56 days during the preceding 24 months.

Absenteeism can be caused by several skill-deteriorating (Overby, 2006) conditions, brought on by the infection of HIV/AIDS. These conditions can be broken down into three categories: physical consequences, neuropsychological consequences and psychosocial consequences (Overby, 2006). Pulmonary, rheumatological and neurological consequences are the main physical conditions associated with HIV/AIDS. Pulmonary ailments cause endurance and breathing problems. Rheumatological ailments affect joints and cause a decrease in general mobility (Overby, 2006). Neurological aliments cause nerve damage and a decrease in motor skills. As a result of this, jobs which require manual skills, physical endurance or refined motor skills become increasingly difficult for an HIV/AIDS sufferer (Overby, 2006). Many agricultural jobs require the above skills.

Neuropsychological consequences cause neurocognitive difficulties. Neurocognitive difficulties cause a decrease in response speed, memory and motor functions (Overby, 2006). There are two categories of neuropsychological consequences which can affect HIV/AIDS sufferers: Mild Neurocognitive Disorder (MND) and HIV-Associated Dementia (HAD) (Overby, 2006). The characteristics of MND are attention deficit, impaired learning and new information recall, and speed reduction of information processing. HAD exhibits similar symptoms to MND, but at a

more severe level (Overby, 2006). Therefore, a person with these symptoms may find it difficult to operate heavy machinery.

Psychosocial consequences are brought on by uncertainty of disease progression, future planning, stigmatisation of and discrimination against HIV/AIDS sufferers. These are considered to be stressors, which affect HIV/AIDS-infected employees and employees with infected family members (Overby, 2006). As a result of these stressors, employees may become unreliable and may find it difficult to find and keep a job.

1.2.1.2 Increased organisational disruption

Increased staff turnover, loss of skills, loss of tacit knowledge and declining morale as a result of HIV/AIDS cause disruption within an organisation. These effects are difficult to quantify. Daly (2000) describes these effects as “unseen costs” whose implications are very serious for any organisation.

Loss of skills has been identified as a common cause of disruption; and training costs are used to quantify it (Daly, 2000). The loss of tacit knowledge and declining morale (due to the loss of co-workers) exacerbates this problem because an employee gains experience by working in a specific environment (Daly, 2000). In addition, high staff turnover makes the transfer of skills increasingly difficult. These losses of intellectual capital are becoming increasingly evident as researchers are focusing more on the human capital aspect of HIV/AIDS.

New recruits are usually categorised by relatively low productivity because the transfer of skills occurs over a period of time, depending on the job description. For example, UNAIDS (1998) estimates that in Mauritius it takes one year for a clothes factory employee to become sufficiently skilled to work on the high-end production line.

1.2.2 Increased costs

Increasing costs of production, with no corresponding increase in productivity, leads to a decrease in current and future profits. This results in less capital being available for investment into the company to increase productivity, expand research and development, or increase skills training (Daly, 2000). Figure 1.2 reflects a breakdown of cost per worker at a South African sugar mill (Morris *et al.*, 2000). Morris *et al.* (2000) calculated that the cost per HIV/AIDS-infected worker per year for the last two years of employment (before leaving the workforce) to be R8463.73. Appendix A (Table A.1) shows the actual cost for each category.

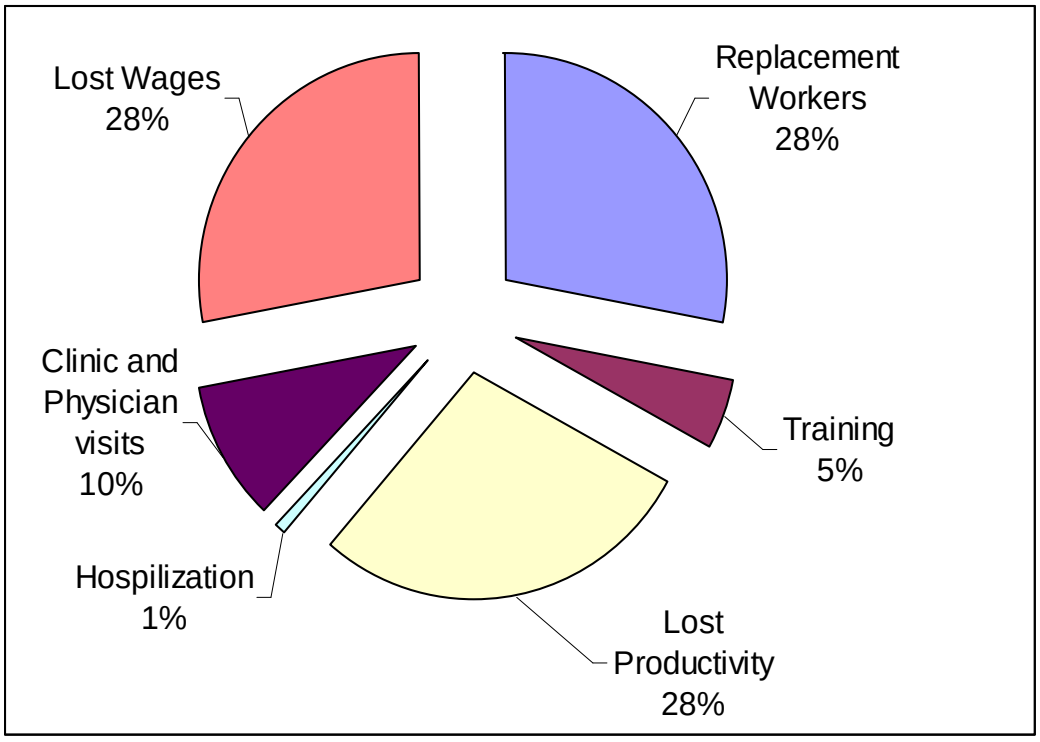

Figure 1.2 Analysis of cost per HIV/AIDS-infected worker at a South African sugar mill.
Source: Morris *et al.* (2000).

Recruitment and training costs increase as a result of increased staff turnover and the simultaneous loss of skills. These costs include hiring additional labour and training regular labour in multiple skill areas, to limit the effects of absenteeism (Daly, 2000). These costs are variable depending on the skill level of the labour. Highly-skilled labour becomes scarce, pushing

wages higher, while semi-skilled or unskilled labour is less expensive to replace and train (Daly, 2000; Rosen *et al.*, 2004). Similarly, Figure 1.2 indicates that replacement workers, lost productivity and training account for 61% of the cost incurred by an HIV/AIDS-infected worker in a sugar mill (Morris *et al.,* 2000).

Health and medical costs are expected to increase significantly with high prevalence rates of HIV/AIDS. These costs include clinic and physician visits, hospitalisation and any HIV/AIDS services companies may supply to employees (Daly, 2000; Morris *et al.,* 2000; Rosen *et al.,* 2003; Connelly & Rosen, 2005). Morris *et al.* (2000) calculated clinic, physician and hospital costs at 11% of the total cost incurred by an HIV/AIDS-infected sugar mill worker per year (Figure 1.2 and Appendix A (Table A.1)). Large companies in South Africa have responded to HIV/AIDS and have instituted prevention programs. In the agricultural sector in South Africa 30% of agribusiness firms offer medical aid to 8% of their skilled workers. The agricultural sector offered the least medical benefits of all the sectors in Connelly and Rosen's 2005 study. Most smaller companies have not instituted prevention or policy programs to respond to HIV/AIDS (Connelly & Rosen, 2005). Connelly and Rosen (2005) attribute this lack of response to a lack of information about and access to services, low willingness to pay, stigma associated with HIV/AIDS and a lack of pressure to act. However, Daly (2000) considers the cost of a health care plan as an investment, because if it is successful it will limit or prevent absenteeism and sustain productivity.

Insurance cover and pensions will rise due to life insurance premiums and pension fund commitments rising as a result of early retirement and death associated with morbidity and mortality caused by HIV/AIDS (Daly, 2000). However, the effect of these costs varies with the skill level and job security of the employees. Connelly and Rosen (2005) found that only 60% of agribusiness firms in South Africa offered retirement benefits to an average of 35% of all enrolled employees, and 30% of agricultural firms offered medical benefits to an average of 6% of the total enrolled employees (the other 40% and 70% of the agribusiness firms respectively did not offer these benefits to any employees). The agricultural sector was the least likely of all the sectors to offer retirement benefits. Permanent, highly-skilled labour accrues more benefits than

unskilled temporary labour (Connelly & Rosen, 2005). Similarly, AIDS-related costs will be severely increased if funeral costs are provided by the company (Daly, 2004).

1.3 Declining profitability

The impact of HIV/AIDS decreases productivity and increases costs, and therefore profitability declines. Figure 1.3 indicates that delays in responding to HIV/AIDS increase the cost of responding and the subsequent costs (Daly, 2000) of responding. Some studies have shown that early prevention policies have a cost saving of 3.5 to 7.5 times the cost of intervention (Loewenson, 1999, cited by Daly, 2000). However, these figures will depend on the type of enterprise, prevalence rate and type of labour employed. Many companies are unwilling to release confidential data on the economic impact of HIV/AIDS and therefore the data available on the effectiveness of intervention is limited (Daly, 2000). Connelly and Rosen (2005) found that four out of five firms in the agricultural sector believed HIV/AIDS would have a large impact on business; and these firms were more likely to be found in KwaZulu-Natal.

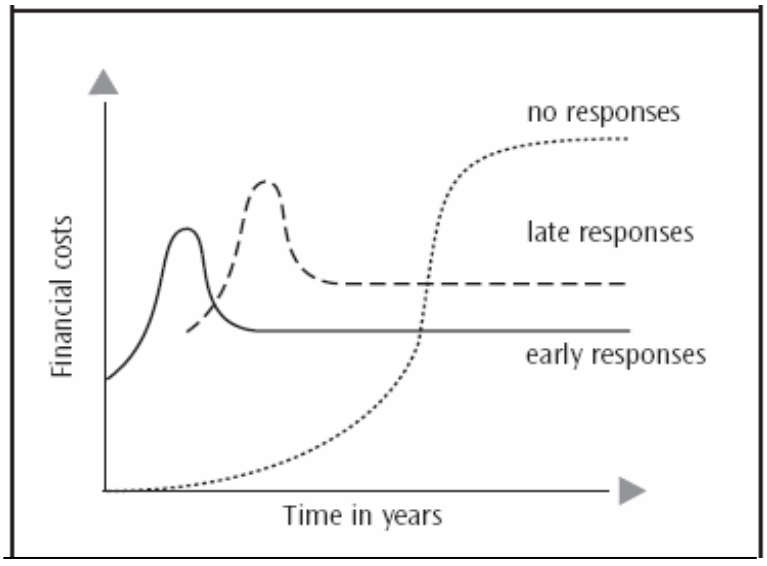

Figure 1.3 Conceptual business cost curves of response to HIV/AIDS.
Source: Aventin & Huard (1998), cited by Daly (2000).

1.4 HIV/AIDS and the law

The Department of Labour in South Africa released a paper in 2003 on HIV/AIDS technical assistance guidelines. This paper was written in an effort to better understand the effects of HIV/AIDS on business and the legal requirements of businesses. There are several laws which business should be aware of with respect to HIV/AIDS. These are the South African Constitution (Act 108 of 1996), the Labour Relations Act (No. 66 of 1995), the Employment Equity Act (No. 55 of 1998), the Basic Conditions of Employment Act (No. 75 of 1997), the Promotion of Equality and Prevention of Unfair Discrimination Act (No. 4 of 2000), the Occupational Health and Safety Act (No. 85 of 1993), and the Compensation for Occupational Injuries and Disease Act (No. 130 of 1993).

1.4.1 The South African Constitution (SAC) (Act 108 of 1996)

The SAC states that all people are entitled to equality and equal protection before the law. People may not be discriminated against by the state or other people on the grounds of race, gender and disability. This Act also covers any other grounds listed in the Constitution, unlisted grounds and a combination of grounds (Department of Labour, 2003). It does not explicitly mention HIV/AIDS, but in court cases where participants have been unfairly discriminated against because of HIV/AIDS, the Supreme Court has ruled in favour of the infected person (Department of Labour, 2003). The SAC also states that every person has the right to privacy and bodily integrity; may not be treated or tested without informed consent; and has the right to privacy with regard to his or her health status (Department of Labour, 2003).

1.4.2 Labour Relations Act (No. 66 of 1995) (LRA)

The LRA governs the dismissal of employees. Employees whose contracts are terminated unfairly as a result of their being HIV-positive are being discriminated against and are deemed to be unfairly treated (Labour Protect, 2006). These employees may take their case to the Labour Court and be re-employed or granted a settlement/compensation. Employees may only be dismissed on grounds of wrongful conduct or if they are unable to carry out their job description

(Labour Protect, 2006). It is suggested that employers should investigate alternative solutions (other than dismissal, such as extended sick leave without pay or alternative duties) for employees who cannot carry out their jobs. An incapacity hearing is required before an employee can be dismissed on grounds of inability to carry out his or her job description (Labour Protect, 2006).

1.4.3 Employment Equity Act (No. 55 of 1998) (EEA) and the Promotion of Equality and Prevention of Unfair Discrimination (No. 4 of 2000) (PEPU)

The EEA states that no person should unfairly discriminate against an employee (whether directly or indirectly) on the grounds of race, sex, gender, pregnancy, marital status, family responsibility, ethnic or social origin, colour, sexual orientation, age, disability, religion, HIV/AIDS status, conscience, belief, political opinion, culture, language and/or birth (Department of Labour, 2003). The EEA includes a job applicant under the definition of an employee, therefore job applicants are also protected from the above discriminations (Department of Labour, 2003; Labour Protect, 2006). Medical testing (employees may not be forced to reveal their HIV/AIDS status) is also disallowed under this Act (except under certain circumstances). If HIV/AIDS tests are required, the matter must be contested before a Labour Court. However, it is not considered unfair to discriminate against a person on the basis of a job requirement. For example, if a job requires strenuous physical activity, denying the job to an HIV/AIDS-positive candidate who is physically impaired would not be considered unfair discrimination (this is not discriminating against the candidate's HIV/AIDS status but rather their physical fitness) (Department of Labour, 2003; Labour Protect, 2006).

The PEPU Act further enforces non-discrimination (including for those who are HIV/AIDS-positive) in the workplace (Department of Labour, 2003; Labour Protect, 2006). This Act also protects against any harassment; therefore, no person may be harassed with regard to his or her HIV status (Department of Labour, 2003; Labour Protect, 2006).

1.4.4 Basic Conditions of Employment Act (BCA) (No.75 of 1997), Occupational Health and Safety Act (OHS) (No.85 of 1993) and the Compensation for Occupational Injuries and Disease Act (COD) (No.130 of 1993)

These Acts do not directly refer to HIV/AIDS; however, they are important for management of HIV/AIDS infected employees by business. The BCA sets the standards for working hours and leave (Department of Labour, 2003, Labour Protect, 2006). This Act stipulates that employers must provide employees with six weeks of paid sick leave every three years (including HIV/AIDS employees). Under the OHS Act it is the employer's responsibility to minimize the risk of HIV/AIDS exposures. If an employee contracts HIV/AIDS through workplace exposure he/she may claim for benefits in terms of Section 22 (1) of the Act (Department of Labour, 2003; Labour Protect, 2006).

1.5 Conclusion

Susceptibility and vulnerability have been defined in this chapter. A review of literature shows that commercial farm businesses in South Africa are both susceptible and vulnerable to the effect of HIV/AIDS. Farm businesses are susceptible because of the high prevalence rate of HIV/AIDS in semi-skilled or unskilled labour in South Africa. Labour intensive farm businesses are particularly vulnerable to the morbidity and mortality effects on labour. Current South African labour legislation limits the extent to which businesses can reduce their vulnerability to HIV/AIDS. However, it has been emphasised by Daly (2000) that an early, pro-active response to HIV/AIDS can minimise the effects of the pandemic on the business in the long term. The next chapter reviews responses available to South African businesses.

Chapter 2: The response of businesses to HIV/AIDS

This chapter reviews the key principles for formulating a workplace policy and responses available to businesses. Examples of responses used by different businesses are also reviewed.

2.1 Key principles

HIV/AIDS is a workplace issue and it should be recognised as such by employers, governments and NGOs. Therefore, the treatment of HIV/AIDS should be the same as that of other serious illnesses or conditions encountered in the workplace (International Labour Organization (ILO), 2001). The workplace is considered to be an integral part of the community and therefore can provide an effective base to limit the spread of HIV/AIDS. According to the ILO (2001), businesses must understand the following key principles in order to formulate a successful business response to HIV/AIDS (ILO, 2001):

- Non – discrimination,
- Gender equality,
- Healthy working environment,
- Social dialogue,
- Screening for purposes of exclusion from employment and work processes,
- Confidentiality,
- Prevention, and
- Care and support.

Non-discrimination of workers with HIV/AIDS will aid the promotion of prevention policies and treatment to communities. Discrimination leads to the stigmatisation of HIV/AIDS sufferers, and infected workers become less willing to go for treatment (UNAIDS, 1998; ILO, 2001). Similarly, the gender implications of HIV/AIDS must be considered. Women are in many cases more likely to become infected or be affected by HIV/AIDS (UNAIDS, 1998; ILO, 2001; United Nations, 2005) for biological, socio-cultural and economic reasons. Therefore, it is important for

employers to promote gender equality and empowerment of women in the workplace in order to allow women to cope better with HIV/AIDS (UNAIDS, 1998; ILO, 2001).

A healthy work environment is necessary to prevent the spread of HIV/AIDS within the workplace. The work environment should comply with the respective country's health and safety laws. Social dialogue, or co-operation and trust, should be encouraged between employers and employees. This is necessary to implement successful HIV/AIDS prevention programmes. Screening for HIV/AIDS should not be a requirement for a job and HIV/AIDS should not be a cause for termination of a contract. Infected workers should work for as long as they are medically fit. Confidentiality of a worker's HIV/AIDS status is encouraged to ensure that infected workers are not discriminated against (ILO, 2001).

HIV/AIDS infection can be prevented. Prevention programs should be instituted to raise the workforce's awareness of the threat of HIV/AIDS. Prevention can be achieved through changes in behaviour, knowledge, treatment and a non-discriminatory environment. Infected workers should also be afforded care and support, as well as any health programs offered by the business (ILO, 2001).

2.2 HIV/AIDS strategies used by businesses

The response of a business to HIV/AIDS depends on various factors, the most important being financial and human capital resources. Large companies have the resources to institute extensive HIV/AIDS policies, with far-reaching consequences (Daly, 2000). Small and medium enterprises (SMEs), which have fewer resources, may have relatively less incentive to invest in HIV/AIDS policies (Connelly & Rosen, 2005). However, in some instances SMEs have produced innovative strategies (Daly, 2000). Ellis (2006) found that response to HIV/AIDS is directly linked to company size. This study found that the majority of medium and large companies surveyed had a HIV/AIDS policy in place, while small companies generally had not responded.

Businesses have four basic response options available to them, which are not mutually exclusive. The first option is to invest in HIV prevention programs to reduce the incidence of the disease in

the workforce (Rosen & Simon, 2003). The second option is to provide health care and treatment for infected employees, with the objective of retaining them in the workforce and therefore delaying the costs of AIDS (Rosen & Simon, 2003). The third option is for the business to train existing employees and broaden their skill base. This increases a business's human capital base and provides a partial solution to absenteeism (Rosen & Simon, 2003). The final option is for businesses to change their benefit policies, contract structures and hiring practices to reduce the risk of employing high-risk personnel and therefore reduce exposure to HIV/AIDS costs (Rosen & Simon, 2003).

Implementation of the response options extends to four broad areas of business (Daly, 2000). Table 2.1 shows the interaction of HIV/AIDS strategies, business operations and community relations. A prominent theme through the literature reviewed is that large business must be the leaders in these strategies, because they have less resource constraints than small or medium businesses.

Burden-shifting practices are strategies which shift the cost of HIV/AIDS from the private sector to other sectors such as government, households and non-governmental organisations (NGOs), (Rosen & Simon, 2003). Businesses can shift the burden by using practices such as pre-employment screening, reductions in employee benefits, restructured employment contracts, outsourcing of low-skilled jobs, selective retrenchments and changes in production technologies (Rosen & Simon, 2003), thereby reducing the cost of HIV/AIDS to the employer. Sparrow *et al'*s (2008) study of the effect of labour legislation on agricultural labour demand found that new labour legislation will decrease the demand for labour (through increased costs) and increase the demand for machinery, chemicals and contractors.

Table 2.1 How implementation of responses to HIV/AIDS extends to the four broad areas of business.

Area of business	Response	Strategy
Core business operations	1. Non-discrimination	HIV/AIDS policy
	2. Prevention, education, and behaviour change	Prevention and education programs
	3. Testing and counselling	Programs that enable people to determine their HIV status and support them in dealing with the outcome
	4. Care, support and treatment	Access to treatment, support and care
Business partners	5. Product and service donation	Donations by companies of products, services and expertise
	6. Business associates and supply chain engagement	Extending policies and programs to suppliers and business associates
Community	7. Community and government partnerships	Collaboration between business and the public sector NGOs
	8. Corporate philanthropy	Philanthropic donations from companies
Advocacy and leadership	9. Advocacy and leadership	Business leaders promoting change and taking leadership roles in the fight against HIV/AIDS
	10. Monitoring, evaluation and reporting	Documentation and reporting on outcomes of programs. Monitoring and evaluation of these programs.

Source: Adapted from Daly (2000) and Global Business Coalition (2006)

However, Rosen and Simon (2003) state that these practices are not solely the result of HIV/AIDS (Table 2.2). These changes can also be attributed to globalisation and changes in the social and political environment (such as labour legislation, affirmative action and high health care costs). These changes in conjunction with HIV/AIDS are becoming serious problems for infected households (Rosen & Simon, 2003).

Table 2.2 Primary cause of burden-shifting in South African companies.

Practice	Mainly a response to globalisation	Mainly a response to HIV/AIDS	Both
Mechanisation	x		
Hiring non-permanent workers	x		
Pre-employment screening		x	
Selective retrenchment/ medical retirement		x	
Altering employment contracts			x
Hiring expatriates			x
Relocating to another country			x
Cutting benefits or capping premiums			x

Source: Rosen & Simon (2003)

2.3 Responses to HIV/AIDS by large agribusinesses

In a study conducted in Swaziland, two types of responses to the HIV/AIDS epidemic were documented (UNTG, 2002). These two responses dealt with production and preserving human capital in farm businesses. The production strategy involved outsourcing many of the farm activities to contractors, mechanising and multi-skilling of permanent labour. However, this strategy was attributed more to the worldwide trend (globalisation) of the 1990s than seen as a response to HIV/AIDS (UNTG, 2002).

The human capital preservation strategy was started using educational health programmes (UNTG, 2002). These programmes included advice on disease, provision of nutritional diets and other information, education and communication programmes. However, these programs were mainly provided by the estate sector (UNTG, 2002). Other farms have been known to distribute condoms and/or use religious activities as a form of education, in an effort to alter the sexual behaviour of the workforce (UNTG, 2002). Two important observations were made: firstly, that there was very little collaboration between organisations and, secondly, that collaboration was limited by financial and personnel resources (UNTG, 2002). It is noted that some of these programmes were introduced before HIV/AIDS became known as a threat.

Sappi, a large South African agribusiness, has reported on its website that it has taken a pro-active approach to managing HIV/AIDS because it is vulnerable to the disease's effects. All of Sappi's operating units have set up committees and elected HIV/AIDS workplace co-ordinators for instituting and overseeing Sappi's prevention program. Education is an integral part of the prevention program; the information provided in it must be culturally acceptable and also based on the language and literacy levels of the employees. Awareness days are linked to World AIDS Day, National Condom Week and AIDS Memorial Day. Condoms are also provided to employees in high-risk zones. Antiretrovirals are also provided, however employees must comply strictly with the conditions of use. Sappi has also formed partnerships with Non-Governmental Organisations (NGOs) and the Department of Health in order to support the families of infected employees. Sappi also provides voluntary testing and counselling programs (Sappi, 2006).

2.4 The response to HIV/AIDS by commercial agriculture in South Africa with assistance from NGOs

Farmers' management responses to HIV/AIDS are partially determined by extraneous factors such as the roles of government and NGOs in providing HIV/AIDS services to farm employees. HIV/AIDS services provided to farm workers by the State or NGOs may be complementary to or substitutes for HIV/AIDS services provided by farm businesses to their workers. This section provides a brief review of the current roles of the State and NGOs in providing HIV/AIDS services to farm workers in KwaZulu-Natal (KZN) and various other provinces of South Africa. It not only provides important context, but it also considers lessons learnt from these projects for the design of future HIV/AIDS programmes in rural commercial farming areas.

According to Subhan (2008), the KwaZulu-Natal Department of Health (KZNDoH) recognises that tackling HIV/AIDS is more challenging in rural areas than in urban ones.

For example, people in rural areas often have relatively poor access to ART service points[2]. Because transport costs can be an important burden on patients accessing ARVs (Anderson, 2006 cited in Jacobs, Schneider & van Rensberg, 2008), the geographical spread of ART service points can implicitly ration ART resources in favour of people living closer to ART sites (Jacobs *et al*., 2008). The KZNDoH has focused its efforts towards curtailing the spread of HIV and providing treatment for people who are HIV-positive (there are 8 accredited ARV initiating sites and 23 decanting sites in the Umgungundlovu Health District). It employs HIV/AIDS counsellors to curtail the spread of HIV in commercial farming areas of KZN. Farm businesses are required to adequately motivate their applications for HIV/AIDS educators or mobile clinics to visit their farms and provide HIV/AIDS education to their employees (Subhan, 2008). Subhan (2008) further notes that there is currently a need to inform farmers about services provided by the KZNDoH.

According to Drimie (2008), and far as the author is aware, no NGO HIV/AIDS programmes in KZN currently target farm workers in commercial farming regions of KZN. There are, however, several NGO-administered HIV/AIDS programmes on commercial farms in other provinces of South Africa. The Sonke Gender Justice Network NGO, for example, is working with commercial farm workers in the Limpopo region of South Africa. Their strategy focuses on gender equality and attempts to further the "men as partners" philosophy. The project aims to encourage men to become involved in responding to gender-based violence and the HIV/AIDS epidemic (Sonke Gender Justice Network, 2008). PHAMSA, in partnership with Hlokomela (initiated in 2005) and facilitated by the International Organisation for Migration, have instituted a commercial farm worker HIV prevention and care project in Limpopo (International Organization for Migration, 2008). The Hlokomela project initially worked with 19 commercial farms but has since expanded its activities to a maximum of 29 commodity farms (limited by the availability of funds). Finally, the Ndlovu Medical Trust is assisting HIV/AIDS projects on two

[2]ART service points may be categorised as ARV initiating sites (also known as referral treatment sites: district and regional hospitals that serve as the treatment site, where detailed assessments are required and a medical practitioner, in consultation with other staff, decide whether the patient will commence with ART) and ARV decanting sites (also known as referring assessment sites: clinics and community health centres that serve as primary sites for entry to the service for the diagnosis, staging and follow-up of ART patients) (Subhan, 2008; Van Rensburg, 2006, cited by Jacobs *et al*., 2008).

commercial farms, namely Schoeman Boerederie in Limpopo Province (initiated in 2004), and Green's Greens Farm in Gauteng Province (initiated in 2003) (Weinand, 2007). These projects are all operating on large farms[3] with adequate resources as well as having assistance from outside sources.

Each of these NGO-run projects typically operates in collaboration with specific farm businesses. They aim to provide a similar set of services such as voluntary testing and counselling (VCT), awareness programmes, and improved access to ARVs. They also typically aim to address gender issues and HIV/AIDS workplace policy (Weinand, 2007). According to Weinand (2007), experience to date shows that farm workers are typically receptive to and trusting of the NGO and more willing to make use of the services provided, especially on farms where the relationship between workers and management is relatively good. It is apparent that significant economies of size exist in these projects, hence the NGOs tend to work with large farm businesses (e.g. Schoeman Boerederie and Green's Greens Farm) or a large number of smaller farm businesses (e.g. the Hlokomela project).

A common impact of these programmes is that workers become more willing to talk freely about HIV/AIDS (that is, discrimination and stigma are less of a factor), and in some cases workers have become willing to disclose their HIV status. Further, experience shows that with the introduction of ARVs, workers tend to take less sick leave. Common challenges faced by these projects include their inability to reach labourers' families, misuse of power by supervisors, stigmatisation and discrimination, cooperation with government, difficulties in finding skilled labour to work on farms, and men's general reluctance to get involved (Weinand, 2007).

These projects are all running on large farms with adequate resources as well as having assistance from outside sources. These projects are reporting successes and are showing that it is possible to overcome hurdles associated with the provision of HIV/AIDS services.

[3] For example, Schoeman Boerdery is 5000ha in extent (Anonymous, 2008) and Green's Greens Farm is a 450ha vegetable farm (AFP, 2007).

This chapter has shown that the response of business to HIV/AIDS is complicated. Businesses must consider their vulnerability to HIV/AIDS and decide what responses best suit them. Response options include the provision of HIV/AIDS services and burden-shifting activities. The following chapter presents a conceptual model of the impact of HIV/AIDS on commercial businesses.

Chapter 3: Conceptual model of commercial farmers responses to HIV/AIDS

This chapter discusses the theoretical relationships between awareness, perception and response to the impacts of HIV/AIDS. Conceptual models are provided and discussed to explain the approach to the research methodology used in this study.

Ellis (2006) noted that many previous studies have focused on evaluating workplace responses (e.g. Morris *et al.*, 2000 and Rosen *et al.*, 2004). The aim of the BER study was to evaluate the impact of HIV/AIDS on different sectors, and to evaluate business awareness of and response to the pandemic using descriptive statistics. The aim of this study is to provide a snapshot view of commercial farmers' awareness, perceptions and responses using cross-sectional data; and, using descriptive statistics and ordinary least square regression, to identify the characteristics of farmers who respond to the HIV/AIDS epidemic. The conceptual model presented here hypothesises the relationship between awareness, perception and response.

Structural equation models are commonly applied in agricultural economics research. For example, they have been applied in studies on soil conservation (Ervin & Ervin, 1982; Barlow, 1995) and supply chain relationships (Mushayanyama, 2005). These models postulate that events happen in a series over time. The conceptual model for this study will be based on structural equation modelling, and more specifically on recursive modelling (causality moves in one direction) (Koutsoyiannis, 1987). The recursive model indicates that farmers must first be aware of HIV/AIDS, then HIV/AIDS must be perceived as a problem; this is followed by the response to the HIV/AIDS problem (Figure 3.1).

The following hypothesis can be inferred from the model shown in Figure 3.1.

H_1: The more aware the farmer is of HIV/AIDS, the more likely it is that HIV/AIDS will be perceived as a problem.

H_2: A farmer will not respond to HIV/AIDS before he/she perceives it to be a problem.

H_3: Farmers respond to HIV/AIDS to reduce the cost of HIV/AIDS to the business.

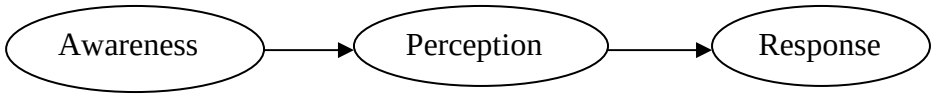

Figure 3.1 Recursive model of the HIV/AIDS awareness to response model.

3.1 Awareness and perception

Farmers must be aware of the HIV/AIDS problem before they can perceive it to be a problem for their businesses. Farmers who are aware of the HIV/AIDS problem will only attempt to solve it if they perceive it to be worth trying to solve. Ellis (2006) estimated awareness and perceptions using a postal survey and descriptive statistics. The survey included questions on how HIV/AIDS has affected the production side of the business, the business's demand for labour and how HIV/AIDS has impacted on company profits (Ellis, 2006).

3.2 Response

Rosen *et al.* (2004) based their analysis of business costs on incident infections as opposed to prevalent HIV/AIDS infections. This is due to the long period (5 - 10 years) between infection and infection-related symptoms. This approach is based on the assumption that the employee remains employed at the business, and at the time of infection the employee becomes a liability for future costs associated with the infection (Rosen *et al.*, 2003). Rosen *et al.* (2003) state that costs estimated from incident infections allow a business to treat the investment in HIV/AIDS programs as a potential investment which can, therefore, be compared to other investments. The methods used by Rosen *et al.* (2003) to quantify the indirect and direct costs of HIV/AIDS to a business are expressed in Tables 3.1 and 3.2. Their study was conducted over six formal sector

enterprises in Southern Africa and the criteria for inclusion in the study were as follows: an advanced human resources data collection program, willingness to assist in data capture and a willingness to cover some of the costs incurred in the study. Therefore, this study was extremely time- and labour intensive and the results obtained from it were considered to be conservative.

Table 3.1 Methods used to estimate indirect costs of HIV/AIDS to business.

Type of cost	Method
Indirect costs	
Valuation of all indirect costs	Defined a 'wage multiplier' as equal to the ratio of the daily wage plus benefits to the daily wage; 1 day of paid leave was valued at daily wage x wage multiplier. Reduced productivity when at work counted as a fraction of a day.
Sick leave	Multivariate regression analysis to estimate additional days of sick leave taken in the 2 years prior to termination by a sub sample of employees who died in service or were retired on disability during the 3 years preceding data collection.
Supervisory time	Average of supervisors' responses to questionnaires about employees who had died or had retired due to AIDS.
Vacancy	Human resource data or managers' estimates of average duration of vacancies.
Learning curve as replacement worker comes up to speed	Managers' estimates of average time required for replacement worker to become fully productive, multiplied by the gap between full and actual productivity during that period.

Source: Adapted from Rosen *et al.* (2004).

Table 3.2 Methods used to estimate direct costs of HIV/AIDS to business.

Direct costs	Method
Retirement benefits	Difference between present value of pension payments due upon death or disability retirement and present value of pension payments due upon retirement at normal retirement age.
Death and disability benefits	Amount due to employee or beneficiaries upon death in service or disability retirement, plus average administrative fee for benefits schemes. Assumed that premiums will rise exactly as much as the additional claims resulting from HIV/AIDS.
Medical care	Ceiling of HIV/AIDS-related claims for medical aid in last two years of service, weighted by probability of being a member of the medical aid scheme, plus administrative fee of scheme.
Recruitment, training	Human resource data or managers' estimates of the variable costs of recruiting and training a replacement worker.

Source: Adapted from Rosen *et al.* (2004).

Morris *et al.* (2000) conducted a case study on a cohort of sugar mill workers in South Africa. The calculation of the economic impact of HIV/AIDS was based on the enterprise labour's

morbidity and mortality data. The wage level and replacement worker (defined as workers hired in absence of permanent employees) costs were taken from the enterprise payroll (Morris *et al.*, 2000). Lost wages (employees taking ill health leave but who are still on the payroll at 75% of their normal wage) were estimated from the time a permanent employee replaced an employee on ill health (Morris *et al.*, 2000). Industry standards and human resource estimates (with respect to pay level and job description) were used for losses due to productivity and training costs. Hospitalisation and health care costs were based on what the workers were reimbursed in the past. An average cost per visit was calculated from fee service schedules for payment of 'medical providers' (Morris *et al.*, 2000: 935). A model was then formulated projecting these costs over a six year period with an incident infection rate of 2%.

Research conducted in Swaziland (UNTG, 2002) focused on the impact of HIV/AIDS on agriculture and the private sector. This was done by collecting primary data through quantitative and qualitative methods. Questionnaires were used to establish the link between morbidity and mortality (due to HIV/AIDS) and increased health and funeral expenses, productivity losses and intervention strategies used (UNTG, 2002).

Ellis (2006) used a series of questions regarding a company's response to evaluate that company's response. These questions are relatively general, such as "Does your company or group have an HIV/AIDS policy" and "Has your company/ group implemented the following HIV/AIDS programmes (voluntary testing and counselling, awareness program, care, support and treatment program and provision of ARVs)" (Ellis, 2006: 690). The answers to these questions were then reported using descriptive statistics.

3.3 Summary

This chapter has proposed a conceptual model of the impact of HIV/AIDS on businesses. The model indicates that businesses become aware of HIV/AIDS, they perceive it to be a business concern and then they respond to HIV/AIDS. Several methodologies have been used in the literature reviewed to estimate the impacts of HIV/AIDS on businesses. These methods have included evaluating workplace responses (by calculating costs and benefits of workplace

responses) or evaluating business awareness and responses to HIV/AIDS using descriptive statistics. The next chapter presents the data sources, survey questionnaire and research methodology used in this study.

Chapter 4: Survey questionnaire, data collection and research methodology

This chapter reviews the survey questionnaire and data collection process. This is followed by a discussion of the statistical analysis that is applied to this study.

4.1 Survey questionnaire

A structured survey questionnaire (Appendix B) was designed to elicit information about respondents' awareness of HIV/AIDS, their perceptions of the economic impacts of HIV/AIDS on their farm businesses, and their management responses, if any, to HIV/AIDS. A pilot survey of five farms was conducted during January 2007 to ensure that the questionnaire was user-friendly.

The survey questionnaire (Appendix B) contains six sections with each section targeting specific information. Section 1 comprises operator information which includes: age, education, management experience (on the current farm and total) and the legal structure of the farm. Section 2 comprises information about the respondent's farm. This includes distance from the nearest large town or city and distance from the farm's main labour source. The enterprise mix is ascertained by listing a number of different enterprises (including a category labelled "other" which accounts for enterprises not listed) and having respondents list what percentage of gross income is allocatable to each enterprise. Labour force characteristics are then asked about. The labour force is broken down into unskilled and skilled permanent labour, temporary or seasonal labour and labour outsourced through contractors. Skilled workers are defined as a combination of the Department of Labour's skilled and semi-skilled definitions. Labour that falls into this category is typically drivers, skilled dairymen, and so on, who require training and are hard to replace. Respondents were required to list how many individuals in each category are employed on the farm and what they perceive the HIV prevalence rate in each category to be.

Section 3 of the questionnaire aimed to evaluate a respondent's awareness and perception of and response to the HIV/AIDS pandemic. Awareness and perception of the respondent towards HIV/AIDS and the respondent's perception of the impacts of HIV/AIDS on the farm business (in terms of productivity as well as costs) are evaluated in this section. The information elicited here is qualitative rather than quantitative in order to make the questionnaire easier to complete. A table of possible responses is then provided. The responses listed in the table were compiled from previously-reviewed literature (Daly, 2000; Morris *et al.*, 2000; Rosen *et al.*, 2003 and Rosen & Simon, 2003) and discussions held with respondents during the pilot survey. The table is also accompanied by three questions regarding each response. These questions are (1) "Do you currently use this response to combat HIV/AIDS?", (2) "If yes, how many years ago did you start using this response to combat HIV/AIDS?" and (3) If yes, on a scale of 1-10 indicate the importance of the response to managing HIV/AIDS on your farm". Question 2 was not answered particularly well by respondents as it tended to be left unanswered or was answered by giving the total amount of time the response had been used (as opposed to how long it had been used to combat HIV/AIDS). Therefore this information was excluded from analysis.

Section 4 inquired about the respondent's farm financial characteristics. These included turnover, a debt: asset ratio, the amount of turnover spent on debt servicing, how HIV/AIDS has affected profit, and how it is likely to affect profit in 5 years' time. Respondents were found to be reluctant to provide information about farm financial status, even though confidentiality was guaranteed. However a satisfactory amount of respondents answered these questions. Turnover was established as a continuous variable rather than a categorical variable and debt servicing inquired about as a percentage of turnover. As is common in other HIV/AIDS surveys (Ellis, 2006) the impact of HIV/AIDS on profitability is elicited by means of a categorical question.

Section 5 attempted to evaluate the respondent's attitude towards risk and managerial style. This was done by providing several statements for the respondent to rank on a scale of 1-5. These answers were then used to calculate a risk index and managerial style index. Section 6 aimed to evaluate how HIV/AIDS has affected the respondent's demand for labour, how HIV/AIDS stigma has affected uptake of services provided, and other anecdotal information regarding HIV/AIDS.

Although the survey was confidential, the participants were invited to leave their name and contact details if they were willing to participate further in the research. Seventeen of the respondents completed this section and were contacted in follow-up telephonic interviews. These interviews were conducted to better ascertain the relationship between a participant's actual service delivery of HIV/AIDS services offered to their workforce, and their responses to a question in the original survey about how important each service is to their overall HIV/AIDS strategy. In general, the results of the telephonic interviews coincided with the surveys: if a participant rated a HIV/AIDS service as 9 or 10 in the survey, it was found (telephonically) that this service was reliably offered on a regular basis. In the same way, low scores were associated with infrequent provision of the service.

4.2 Study population and data collection for empirical estimation of the model

The empirical analysis presented in this paper is based on a census postal survey of 2409 Kwanalu commercial farmer members, conducted in April and May 2007. A total of 326 questionnaires were returned (a 13.5% response rate). Thirty percent of returned questionnaires were only partially completed but were nonetheless included in the statistical analysis presented in this paper. Approximately 70% of commercial farmers in KwaZulu-Natal are members of Kwanalu (Kwanalu, 2007). The response rate in this research is comparable to other studies on a similar population by Rodewald (2007), however Barlow (1995) received a 35% response rate. Barlow (1995) had access to the list of addresses and was able to send reminder letters, whereas in this study this was not possible, although Kwanalu did send out a reminder email. Ellis (2006) reported a total response rate of 22.1% and some sectors had an 11% response rate. According to Gujarati (2003: 899-903), 50 - 100 cases may be considered a large sample, so the response to this survey questionnaire is considered adequate for the purposes of this study.

As is common with postal surveys, the low response rate to this survey implies the possibility of selection bias. In other words, statistics presented in this analysis describe the group of survey respondents, who are not necessarily representative of the population of all commercial farmer members of Kwanalu. Table 4.1 presents descriptive statistics of the respondents by farm type

and farm size respectively. Farm type classification is based on the enterprise that contributes most to farm turnover. If no single enterprise accounted for at least 60% of turnover, the farm was classified as a mixed farm. The major enterprises of farms classified under "other" include pigs, poultry, vegetables and maize.

Table 4.1 Percentage of Kwanalu survey respondents by farm type and size (n = 258), 2007.

		Farm type (%)							
		N	**Dairy %**	**Extensive livestock %**	**Sugar %**	**Timber %**	**Other* %**	**Mixed %**	**Total %**
Farm size	**Small**	**88**	12.5	29.5	11.3	5.7	16.0	25.0	100
	Medium	**84**	13.1	7.1	46.4	6.0	9.5	17.9	100
	Large	**86**	24.4	0	19.8	7.0	21.0	27.8	100
	Total	**258**	16.7	12.4	25.6	6.2	15.5	23.6	100

* - includes pigs, poultry, vegetables and maize.

Farm size classification was based on farm annual turnover (gross income): the third of respondents with the smallest turnovers (turnover < R1.5 million) were classified as being "small", the third of respondents with the largest turnovers (turnover > R3.6 million) were classified as being "large", and the remaining third were classified as being of "medium" size. Turnover was preferred to labour force size and number of hectares (area) as a measure of farm size due to the many different farm types in the survey. Area is a poor measure of farm size because land is variable in terms of its resource availability and quality, and therefore farms of different types might require different amounts of land for the same value of output (Lund, 2007). Commercial farmers may, for example, choose to contract out activities and therefore have a relatively small permanent labour force but have the same value of output as other similar farm types. Therefore, classification of farm size using labour force size is inappropriate.

The distribution of farm types in this study is similar to that found by Barlow (1995) in a postal survey of commercial farmers in KwaZulu-Natal. The absence of extensive livestock farms in the group of "large" farms is attributed to farm size being measured using farm turnover instead of farm area (hectares), which is often considered an inappropriate measure for comparing the relative sizes of different types of farms (Lund, 2007).

4.3 Statistical analysis

In this study, analysis of variance (ANOVA), principal components analysis (PCA) and ordinary least squares (OLS) regression are used to estimate the impact of HIV/AIDS on Kwanalu commercial farmers. This section discusses these techniques and specifies the OLS models.

4.3.1 Analysis of variance (ANOVA)

Analysis of variance is used to compare the mean statistics derived from the data. Due to the nature of the study, several types of *post hoc* tests are used in conjunction with the ANOVA tests. These *post hoc* tests included the Dunnets T3 test, Games-Howell test, Tukeys test and the Hochberg GT2 test. The basis for deciding which test is to be used is based on the homogeneity/heterogeneity of the group sizes and variances. In order to test the homogeneity of the variance, the levene statistic (SPSS, 2007) is calculated using SPSS. If the variance is found to be heterogeneous, the Welch statistics (which is more robust than the F-statistics) was also calculated in the ANOVA test (SPSS, 2007). Once the ANOVA result is established (as significant), the type of *post hoc* test is decided, as different tests are more suitable for different statistics. The *post hoc* tests are used to establish variance between the farm size and enterprise type groups. The Dunnets T3 test is used in cases of unequal variance but equal group sizes. The Games-Howell test is used for unequal variance and unequal group size. The Tukeys test is used when group sizes and variance are homogenous, while the Hochberg GT2 test is used for unequal group size and equal variance.

These tests are used to analyse the awareness and perception descriptive statistics in Chapter 5 and the principal components analysis in Chapter 6. Where a *post hoc* test is used, the type of test and reason are specified.

4.3.2 Principal components analysis (PCA)

Principal Components Analysis (PCA) attempts to reduce the dimensionality of a data set. The original variables are transformed into principal components (PC) which are orthogonal. The first PC explains the highest proportion of total variance (in the original data) and successive PCs explain diminishing proportions of the total variance (Dunteman, 1989). A small set of orthogonal variables is easier to interpret and utilise in further analysis than a large set of correlated variables.

Relationships between HIV/AIDS response adoption decisions[4] are uncertain and are not postulated *a priori*. Therefore, a principal components analysis is used to analyse the data because it has no explicit underlying model (Joliffe, 1986: 116). If adoption of the HIV/AIDS responses is sequential, the correlation between a response and a preceding response will be moderate and the correlation with a response that follows will be low. If responses are adopted jointly, the correlation between the responses will be high (i.e. if responses are not jointly adopted the correlation will be low) (Ferrer, 1998). The correlation for responses which are substitutes will be negative. According to Ferrer (1998: 124), "The aim of a PCA is to present some aspect of the correlation matrix; these relationships will be captured in the principal components".

This PCA will be applied to the ranking by all respondents in Chapter 6 to obtain an orthogonal response variable. The orthogonal response variables will be used in an OLS regression.

4.3.3 Ordinary least squares (OLS) regression

Ordinary least squares regression was pioneered by Gauss. This statistical method is based on certain assumptions and has become a popular method used widely today (Gujarati, 2003: 58). Regression analysis is used to explain the variation of the dependent variable as a function of its

[4] Use of the term adopters in reference to a person adopting a strategy is used in peer reviewed literature. Mac Nicol *et al.,* (2007) use the term in reference to commercial farmers adopting risk management strategies.

explanatory variables. Therefore, it is an appropriate method to use in this research to investigate which socioeconomic variables influence respondents' adoption of HIV/AIDS responses.

The general OLS model is:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + ... + \beta_j X_{ji} + \varepsilon_i \quad (3.5)$$

Y_i = the i'th observation of the dependent variable;

β_0 = Constant term;

β_j = the j regression co-efficients or parameters to be estimated;

X_{ji} = the i'th observation of the j'th independent variable;

ε_i = the i'th observation of the residual error term;

This OLS model is subject to the following assumptions of a classic linear regression model (CLRM). These assumptions (Gujarati, 2003: 66 – 75) are:

1. The regression model is linear in parameters.
2. X values are fixed in repeated sampling.
3. Zero mean value of disturbance u_i.
4. Homoscedascedasticity or equal variance of u_i.
5. No auto correlation between the disturbances.
6. Zero covariance between u_i and X_i.
7. The number of observations *n* must be greater than the number of parameters to be estimated.
8. Variability in X values.
9. The regression model is correctly specified.
10. There is no perfect multicollinearity.

4.4 Model specification for OLS regression of the general response index and the HIV/AIDS services vs. burden-shifting principal component

Two ordinary least squares regression (OLS) models are used. Equation (1) provides the conceptual model for the two response regressions used in Chapter 6. In terms of the methodology used in the reviewed literature, two possible approaches were considered. These

were either to do a case study analysis of a small number of farms, or to do a large postal survey. A case study analysis would essentially evaluate the impact of HIV/AIDS on the farm and the responses used quantitatively (Morris *et al.,* 2000). However, as research at the commercial farm level is limited, this approach would only provide limited means of understanding the impacts of HIV/AIDS in different environments. Consequently a postal survey approach (similar to Ellis, 2006) was chosen, using mostly qualitative information to target as many different enterprise types in as many different areas as possible. In addition to this, the postal survey assessed the economic costs of HIV/AIDS on commercial farms and respondents' awareness and perceptions of the pandemic – both of which are critical to understand in order to make further recommendations. The aim of this study was to go a step further than similar research conducted in other sectors (Ellis, 2006), by using OLS regression to estimate the socio-economic factors which affect commercial farmers' responses.

In this study response is measured by calculating a response index from respondents' perceptions of the responses used on their farms. Principal components analysis is then be conducted on the response index to elicit an orthogonal response variable. Response is a function of a respondent's awareness of HIV/AIDS, his perception of the impacts of HIV/AIDS, his personal and financial characteristics and the enterprise characteristics.

Response = f(Awareness of HIV/AIDS; Perception of HIV/AIDS; Respondent characteristics; Enterprise characteristics)……..(1)

4.4.1 Model specification for the OLS regression of the general response principal component

Table 4.2 shows the variables considered for the general response regression (derived from the broad model specification in equation (1)) and their expected signs. Older, more experienced farmers are more likely to have established enterprises and will therefore have the ability to respond more to HIV/AIDS. Likewise, education is also expected to be positively related to response. A higher education will make access to and understanding of information about the pandemic and its effects easier to understand. Total labour and higher proportions of skilled

workers are expected to increase response because of the effects of HIV/AIDS on absenteeism and staff turnover.

Distance from the nearest town is considered to have a negative relationship because respondents who are further away will have less access to clinics and may already be mechanised because access to labour is likely to be relatively more difficult. The enterprise type dummy variables include dairy, extensive livestock, timber, other and mixed farms with the benchmark category being sugarcane. Depending on the labour intensiveness of the enterprises, they may have a higher (+) or lower (-) response to HIV/AIDS than sugarcane producers.

Table 4.2 Explanatory variables expected to influence general response, HIV/AIDS study, KwaZulu-Natal, 2007

Variable	Label	Measurement	Hypothesized Relationship
Age	AGE	Years	+
Education	EDU	Years	+
Total farming experience	EXP	Years	+
Distance from town	NEART	Kilometres	-
Sugar cane		Benchmark category	
Dairy enterprise	DAIRYD	1= dairy, 0 = not dairy	-
Extensive livestock	EXTLIV	1 = extensive livestock, 0 = not	-
Timber	TIMD	1 = timber, 0 = not timber	±
Other	OTHD	1 = other, 0 = not other	±
Mixed	MIXD	1 = mixed, 0 = not mixed	±
Unskilled labour as a proportion of total labour	LABUOT	Unskilled labour/ total labour	+
Skilled labour as a proportion of total labour	LABSOT	Skilled labour/ total labour	+
Temporary labour as a proportion of total labour	LABTOT	Temporary labour/ total labour	-
HIV/AIDS is the responsibility of government	GRESP	yes = 1, 0 = no	-
HIV/AIDS is the responsibility of employers	ERESP	yes = 1, 0 = no	+
HIV/AIDS ranked as a business concern	RANK	Likert type scale 1 = unconcerned, 10 = very concerned	+
Management style	MSTYLE	Management style index	±
General cost principal component	COSTPC	Principal components	+
Turnover	TURN	Rands	+
Debt servicing	DS	Percentage of turnover	±

Unskilled workers and skilled workers as a proportion of total workers are included in this model to account for the number and type of permanent staff employed in relation to the total number of workers employed. The higher the number of permanent staff (particularly skilled workers) employed, the more likely a respondent is to use HIV/AIDS management strategies. Temporary labour as a proportion of total labour will have a negative relationship as it is relatively easy to discontinue employment of temporary labour, and therefore the impacts of HIV/AIDS on absenteeism and staff turnover will be less apparent. Therefore, in terms of HIV/AIDS response, businesses are more likely to invest in HIV/AIDS management responses if they perceive there to be tangible benefits. In terms of labour, there will be perceived benefits for investment in permanent staff (i.e. lower staff turnover, better productivity), but no perceived benefits in investing in temporary staff as they move on to a new job at the end of the contract.

Perception variables included "HIV/AIDS is the responsibility of the government" and "HIV/AIDS is the responsibility of employers", and these variables were measured. If respondents perceive HIV/AIDS to be the responsibility of the government they will respond less to HIV/AIDS (hence a negative relationship). In contrast, respondents who perceive HIV/AIDS to be the responsibility of employers will respond more to HIV/AIDS and this variable will have a positive relationship. If respondents rank HIV/AIDS high as a business concern, their response is likely to be higher. Mac Nicol *et al.* (2007) found that perceptions of risk sources correlated to risk-related management decisions (HIV/AIDS was identified as a potential risk source).

Traditional managers (managers who believe employees are not capable of responsibility and must be supervised closely) as opposed to human resources managers are hypothesised to have a negative relationship with response to HIV/AIDS as they are unlikely to invest in strategies which will assist workers. Baruch and Clancy (2000) found evidence of human resource managers in Tanzania being proactive and implementing HIV/AIDS responses (such as education). This was done to inform staff of the risks of infection and of prevention methods. Reactive response (used by more conservative traditional managers) only occurred when HIV/AIDS was identified as a threat to the company, and responses (such as HIV/AIDS testing) were generally discriminatory (Baruch & Clancy, 2000).

A PCA (Appendix D) was conducted on respondents' perceptions of the impact of HIV/AIDS on costs within the business. These costs include cost of time spent on managing HIV/AIDS, sick leave, recruitment and training, medical, retirement and funeral costs with respect to unskilled, skilled and temporary labour (where applicable). Three principal components were extracted from the cost data; however, only one is included in this model specification, the "General Cost PC". This relationship between an increase in general costs and response is expected to be positive because if respondents perceive HIV/AIDS to be increasing costs, they are likely to respond to HIV/AIDS.

Ellis (2006) found that larger enterprises generally responded more to the impacts of HIV/AIDS than smaller enterprises. However, in situations where respondents may work closely with labour on their farms (especially on small farms, where permanent staff are critical), respondents with relatively smaller business (indicated by low turnovers) may respond more to HIV/AIDS.

The impact of debt servicing on HIV/AIDS responses may be negative due to respondents having a low liquidity and, therefore, being unable to respond to HIV/AIDS using expensive response options such as provision of ARVs, medical aid, and life and disability insurance – or burden-shifting responses such as mechanisation. However, HIV/AIDS may already have caused the respondents to mechanise and, therefore, will be increasing this figure (hence, debt servicing may be partly endogenous). This is a limitation of using cross-sectional data since a variable, such as debt servicing, may be *ex post* the response.

4.4.2 Model specification for the OLS regression of the HIV/AIDS services vs. burden-shifting principal component

Table 4.3 shows the variables considered for the HIV/AIDS services versus burden-shifting regression model and there expected signs. A negative coefficient is indicative of a variable correlated to using HIV/AIDS services, and a positive coefficient shows a variable correlated with burden-shifting activities.

Table 4.3 Explanatory variables expected to influence the HIV/AIDS vs. burden-shifting principal component, HIV/AIDS study, KwaZulu-Natal, 2007.

Variable	Label	Measurement	Hypothetical Relationship
Age	AGE	Years	-
Education	EDU	Years	-
Total farming experience	EXP	Years	-
Distance from town	NEART	Kilometres	+
HIV/AIDS has decreased the amount of labour available in your area	DECL	yes = 1, 0 = no	+
HIV/AIDS is the responsibility of employers	ERESP	yes = 1, 0 = no	-
HIV/AIDS ranked as a business concern	RANK	Likert 1 = unconcerned, 0 = very concerned	-
Management style	MSTYLE	Management style index	±
Labour Total	LABT	Number of people	-
Unskilled labour as a proportion of total labour	LABUOT	Skilled labour/ total labour	-
Skilled labour as a proportion of total labour	LABSOT	Temporary labour/ total labour	-
Temporary labour as a proportion of total labour	LABTOT	Temporary labour/ total labour	+
Sole proprietorship		Benchmark category	
Partnership	PART	1 = partnership, 0 =not partnership	±
Trust	TRUST	1= trust, 0 = not trust	±
Close corporation	CC	1=CC, 0=not CC	±
Company	COMP	1=COMP, 0=not COMP	±
General cost principal component	COSTPC	Principal components	±
Medical vs. retirement principal component	MRPC	Principal components	-
Benefits vs. vacancies principal component	BVPC	Principal components	-
Turnover	TURN	Rands	±
Debt: Asset ratio	DA	Percentage	-

Older and more experienced respondents are expected to use HIV/AIDS services (such as informal communication and formal adult education) to manage the impacts of HIV/AIDS. These respondents are likely to have more established operations and therefore the capital to invest in HIV/AIDS services. They may also have trained employees over many years, who will be difficult to replace. Respondents who live near towns and are closer to clinics are likely to use HIV/AIDS services such as transport to clinics to mange HIV/AIDS because these facilities are close-by and convenient.

If HIV/AIDS is perceived to have decreased the amount of labour in a respondent's area, it is likely that burden-shifting responses will be used. Decreasing amounts of labour will lead to

increasing competition for that labour, which will directly increase the cost of recruiting labour in addition to costs of training the new employees.

Respondents who perceive HIV/AIDS to be the responsibility of employers are likely to use HIV/AIDS services to preserve the human resources within the business. If HIV/AIDS is ranked highly as a business concern, respondents are likely to use HIV/AIDS services to manage HIV/AIDS because every business has an essential core of employees on which it depends. Traditional managers use burden-shifting activities while human resources managers will use HIV/AIDS services to manage the impacts of the pandemic. Baruch and Clancy (2000) showed that proactive managers (in Tanzania) introduced HIV/AIDS services to their employees to teach them the risks, while reactive managers tended towards discriminatory policies.

Large labour forces are likely to encourage respondents to use HIV/AIDS services to manage the impacts of HIV/AIDS. Respondents with large proportions of permanent employees (unskilled and skilled labour as a proportion of total labour employed) are likely to use HIV/AIDS services. HIV/AIDS services will help to protect the business against absenteeism, staff turnover and loss of vital skills and experience that may be vital in a labour-intensive environment. However, respondents who employ a large proportion of temporary labour are more likely to use burden-shifting activities, as they are unlikely to receive any of the benefits of investing in temporary staff who move on after the contract period has ended.

Legal structure is included in this model using the dummy variable format. A sole proprietorship is considered as the benchmark category and the other legal structures include trusts, partnerships, close corporations and companies. The coefficients may be positive or negative depending on the differences in business structure compared to the benchmark category.

A respondent's perception of the general cost of HIV/AIDS (general cost principal component, Appendix D, Table D.1) may be positive or negative, as it will depend on whether the perceived cost of labour becomes more than the cost of using alternative strategies such as mechanisation. If labour is still relatively more cost-efficient, then HIV/AIDS services will most likely be used. However, if labour becomes relatively less cost-effective, burden-shifting strategies will probably

be used. This is because rational commercial farmers are likely to use the most cost-efficient business strategy.

The medical versus retirement principal component (Appendix D, Table D.1, principal component 3) and the benefits versus vacancies principal component (Appendix D, Table D.1, principal component 2) are both expected to have a negative relationship in the model. This is because investment in medical expenses and employment benefits are included under HIV/AIDS services responses.

Turnover may also be positively or negatively related to type of response. Turnover may be positively related where respondents with large turnovers have enough liquidity to utilise burden-shifting activities such as mechanisation. Alternatively, turnover may relate to provision of HIV/AIDS services, as has been the case for major agribusinesses such as Sappi. This is due to these large corporations having the resources to invest in HIV/AIDS services. The debt: asset ratio is expected to be negatively related to the HIV/AIDS versus burden-shifting model because farmers with large amounts of debt may not have the resources to use mechanisation and other burden-shifting activities and will, therefore, use inexpensive HIV/AIDS services such as informal communication and encouraging voluntary testing and counselling. However, HIV/AIDS may already have caused the respondents to mechanise and they will, therefore, have experienced an increasing debt: asset ratio (hence the debt: asset ratio may be partly endogenous).

4.5 Summary

Chapter 4 has described the survey questionnaire, study population, statistical analysis to be used and the model specifications for the proposed regression models. Drafting of the survey questionnaire was guided by the literature reviewed. The study population will be a census survey of Kwanalu farmers in the KwaZulu-Natal province of South Africa. This population was studied to get a mix of enterprise types and farm sizes. The statistical techniques used to study the data collected included ANOVA, PCA and OLS regression.

Chapter 5: Kwanalu farmers' perceptions of the HIV/AIDS pandemic

This section investigates Kwanalu commercial farmer members' awareness of HIV/AIDS, their perceptions of the impacts of HIV/AIDS on their businesses and their management responses to these perceived impacts.

5.1 Farmers' awareness of HIV/AIDS

Survey participants were asked to rank HIV/AIDS as a concern to their business on a scale of one (not important) to ten (very important). Their responses are tabulated in Table 5.1 by farm size and farm type. Comparison of the mean statistics is conducted using analysis of variance tests (ANOVA). These statistics indicate that a majority of survey respondents are highly concerned about HIV/AIDS, though trends suggest that farmers' concerns about HIV/AIDS tend to increase with farm size, and vary according to farm type. Farmers of typically labour-intensive farm types such as sugar and timber were found to be, on average, relatively more concerned about HIV/AIDS than farmers of typically less labour-intensive farm types such as dairy and extensive livestock farms. This could not be verified using statistical tests. These findings are consistent with the *a priori* expectation that farmers whose businesses are more vulnerable to the impacts of HIV/AIDS will tend to be more concerned about the impacts of HIV/AIDS on their businesses.

Table 5.1. HIV/AIDS ranked as a concern to a sample of commercial farmer members of Kwanalu by farm type and farm size, 2007

		RANK				
		1-2	3-4	5-6	7-8	9-10
		Not important			Very important	
Farm type (n=273)	Dairy (%)	0.0	8.7	39.1	30.4	21.7
	Extensive livestock (%)	13.2	7.9	21.1	23.7	34.2
	Sugar (%)	6.3	3.2	17.5	31.7	41.3
	Timber (%)	5.3	10.5	15.8	52.6	15.8
	Other (%)	10.6	8.5	21.3	34.0	25.5
	Mixed (%)	0.0	7.8	25.0	35.9	31.3
Farm size (n=246)	Small (%)	11.0	12.3	16.4	27.4	32.9
	Medium (%)	2.8	7.0	28.2	26.8	35.2
	Large (%)	1.3	2.7	29.3	44.0	22.7

The survey participants were asked to estimate the prevalence of HIV amongst their permanent and temporary employees. ANOVA tests indicated no significant differences between the groups based on enterprise type for unskilled workers (F (5,209) = 1.673, p=0.142)[5], skilled workers (F (5,202) = 1.312, p=0.260) or temporary workers (F (5, 94) = 1.418, p=0.225). A notable feature of their responses (Table 5.2) is that most respondents perceive HIV infection rates amongst their staff to be in excess of the 28 percent provincial average for adults (20 – 64 years of age) reported by Dorrington *et al*. (2006). Farmers' responses did not vary greatly by farm size, but did exhibit some notable trends with respect to farm type. In particular, dairy farmers, on average, estimated relatively high rates of HIV infection amongst their permanent and temporary staff. Reasons for this are uncertain, but may be due to the fact that dairy farmers often work closely with their staff in dairy parlours and are relatively more aware of their employees' health status. Interestingly, respondents tended to perceive relatively lower rates of HIV infection amongst their temporary staff compared to their permanent staff. This result may reflect the fact that farmers are more easily able to discontinue employment of temporary staff than permanent staff when they display

[5] F(w,x) = y p = z; w = between groups degrees of freedom, x = within groups degrees of freedom, y = F value, z = significance of the F value. This format is used to report all the subsequent ANOVA tests used, unless otherwise stated.

symptoms of poor health. Therefore, substituting temporary workers for permanent workers may offer a partial solution to commercial farmers in managing HIV/AIDS. However, this strategy shifts the burden of HIV/AIDS to the workforce and the public health sector and is not a sustainable solution to the HIV/AIDS problem.

Table 5.2 Kwanalu commercial farmers' estimates of HIV prevalence amongst their staff by farm type, 2007

	Unskilled workers			Skilled workers			Temporary workers		
	HIV prevalence			HIV prevalence			HIV prevalence		
	<25%	26-50%	>50%	<25%	26-50%	>50%	<25%	26-50%	>50%
Dairy (%)	21.9	46.9	31.3	36.8	31.6	31.6	45.5	27.3	27.3
Extensive livestock (%)	34.6	46.2	19.2	21.1	57.9	21.1	28.6	57.1	14.3
Sugar (%)	46.6	37.9	15.5	44.4	44.4	11.1	55.2	37.9	6.9
Timber (%)	35.3	52.9	11.8	25.0	66.7	8.3	50.0	50.0	0.0
Other (%)	22.6	45.2	32.3	32.4	47.1	20.6	20.0	60.0	20.0
Mix (%)	36.4	30.9	32.7	28.6	44.4	27.0	27.8	58.3	13.9
Total (%)	34.7	40.6	24.7	33.2	45.0	21.8	37.3	49.0	13.7

Findings presented in this section suggest that commercial farmer members of Kwanalu are typically highly aware of and concerned about HIV/AIDS. On average, respondents' estimates of the prevalence of HIV amongst their workers are high relative to provincial averages reported by Dorrington *et al*. (2006). The following section explores farmers' perceptions of the impact of HIV/AIDS on their businesses.

5.2 Farmers' perceptions of HIV/AIDS

Respondents' perceptions of the current impact of HIV/AIDS on the profitability of their farm businesses are reported in Table 5.3 by farm size and in Table 5.4 by farm type. ANOVA tests

indicated significant differences based on farm size (F (2,245) = 3.718, p=0.026, Welch statistic[6] p=0.057) and farm type (F (5,292) = 2.156, p=0.059, Welch statistic p=0.036). *Post-hoc* tests indicated that medium-sized farms perceived a significantly higher impact than large farms (p=0.036) (Dunnets T3 test used to account for unequal variance (SPSS, 2007)). Sugar farms perceived a significantly higher impact than extensive livestock farms (p=0.036) (Games-Howell test used to account for unequal variance and unequal sample size (SPSS, 2007)).

Approximately one third of respondents, including almost 60% of respondents from extensive livestock farms, estimated that HIV/AIDS currently has no impact on current farm profitability. The enterprises reporting no impact on profitability are likely to be less labour intensive, and therefore less vulnerable to the impacts of HIV/AIDS. The other two thirds of respondents believe that HIV/AIDS has a negative impact on current farm profitability; however, less than 10% of respondents believed that profits have declined by more than 5%. On average, respondents from medium-sized farms and those from sugar and timber farms believed that HIV/AIDS has had a relatively large negative impact on current farm profitability.

Table 5.3 Kwanalu farmers' estimates of the impact of HIV/AIDS on current farm profitability by farm size, 2007 (n = 248).

	Estimated impact of HIV/AIDS on farm profitability			
	NO IMPACT	**0-2.5% LOWER**	**2.5-5% LOWER**	**>5%**
Small (%)	44.2	31.4	19.8	4.7
Medium (%)[a]	32.9	29.3	20.7	17.1
Large (%)[a]**	20.2	59.5	13.1	7.1
Total (%)	32.5	40.1	17.9	9.5

** - significant at the 5% level of probability

[a] - medium enterprises estimated a significantly higher impact compared to large enterprises.

Farmers' expectations of the future impact of HIV/AIDS on business profitability are likely to impact on their current responses to HIV/AIDS. In general, respondents anticipate that the impact of HIV/AIDS on farm profitability will grow over the next five years: less than 12% of

[2] The Levene statistic indicated that both ANOVA tests had heterogeneous variances and therefore the Welch statistic, more robust than the F statistic, is also to be calculated under these circumstances to test significance (SPSS, 2007).

respondents anticipate that farm profitability will remain unaffected, whereas more than 32% anticipate that HIV/AIDS will have reduced farm profitability by more than 5%.

Table 5.4 Kwanalu farmers' estimates of the impact of HIV/AIDS on current farm profitability by farm type, 2007 (n = 298).

	Estimated impact of HIV/AIDS on farm profitability			
	NO IMPACT	**0-2.5% LOWER**	**2.5-5% LOWER**	**>5%**
Dairy (%)	36.7	42.9	10.2	10.2
Ext livestock (%)[a]	59.5	24.3	8.1	8.1
Sugar (%)[a]**	20.3	41.9	27.0	10.8
Timber (%)	26.3	42.1	10.5	21.1
Other (%)	38.8	36.7	16.3	8.2
Mix (%)	36.5	37.8	17.6	8.1
Total (%)	35.1	38.1	16.9	9.9

** - significant at the 5% level of probability

[a] - Extensive livestock farmers estimated a significantly lower impact than sugar farmers.

Respondents were asked to indicate their perceptions of the impact of HIV/AIDS on staff absenteeism, staff productivity and staff turnover rates as one of the following: "no impact", "small impact", "moderate impact" or "large impact". ANOVA tests indicated significant differences based on farm size and farm type (Table 5.5). Table 5.5 shows that roughly two thirds of respondents believe that HIV/AIDS has had a moderate to large impact on staff absenteeism. Roughly three-quarters of respondents believe that HIV/AIDS has had a moderate to large impact on staff productivity, and approximately half of respondents believe that HIV/AIDS has had a moderate to large impact on staff turnover rates. In general, respondents' rankings tended to increase with farm size and were, on average, higher for respondents from sugar and timber farms and lower for respondents from extensive livestock farms.

Table 5.5 The proportion of Kwanalu commercial farmers who believe the impact of HIV/AIDS on labour absenteeism, productivity and staff turnover to be moderate to large, 2007.

		Increased Absenteeism	Decreased Productivity	Increased Staff Turnover
Farm size (n=252)	Small (%)	54.0[a]	63.6*[b]	31.8[c]
	Medium (%)	64.3	76.2	56.0***[c]
	Large (%)	75.3***[a]	80.0*[b]	49.4*[c]
ANOVA	F test[h] (2, 249)	4.093**	3.208**	5.465***
Farm type (n=314)	Dairy (%)	60.8	74.5	33.3**[f]
	Extensive livestock (%)	38.1[d]	47.6[e]	26.2***[f, g]
	Sugar (%)	72.4***[d]	77.9***[e]	55.8[f]
	Timber (%)	81.0***[d]	85.7***[e]	61.9**[g]
	Other (%)	65.4**[d]	70.6**[e]	41.5
	Mix (%)	63.8*[d]	72.5	52.5
ANOVA	F test[h] (5, 311)	4.135***	4.172***	3.914***

***, **, * - significant at the 1, 5 and 10 % levels of probability respectively.
a - Small farmers' perceptions of increased absenteeism are significantly lower than those of large farmers.
b - Small farmers' perceptions of decreased productivity are significantly lower than those of large farmers.
c - Small farmers' perceptions of increased staff turnover are significantly lower than those of medium and large farmers.
d - Extensive livestock farmers' perceptions of increased absenteeism are significantly lower than those of sugar, timber, 'other' and mixed farmers.
e - Extensive livestock farmers' perceptions of decreased productivity are significantly lower than those of sugar, timber, 'other' and mixed farmers.
f - Sugar farmers' perceptions of increased staff turnover are significantly higher than those of dairy and extensive livestock farmers.
g - Extensive livestock farmers' perceptions of increased staff turnover are significantly lower than those of timber farmers.
h - The Welch test indicated that the F statistics calculated for ANOVA are robust.

This section has shown that Kwanalu commercial farmer members, and especially those from sugar and timber farms, tend to perceive HIV/AIDS to have a moderate to large negative impact on their farms. The following section of this paper examines Kwanalu farmers' perceptions of their responsibility as employers for the prevention and treatment of HIV/AIDS amongst their staff.

5.3 Farmers' responsibility for HIV/AIDS treatment and prevention amongst farm workers

In order to ascertain survey participants' opinions about their responsibility for the prevention and treatment of HIV/AIDS amongst their employees, they were asked to indicate whether or not they agreed with the following two statements: "Managing HIV/AIDS is the primary responsibility of employers" and "The solution to HIV/AIDS requires an integrated approach from government, business and workers." Their responses are reported in Table 5.6.

An ANOVA test indicated significant differences based on farm size ($F(2,251) = 3.126$, $p=0.046$, Welch statistic $p=0.070$) in relation to the first statement. No other significant differences based on farm type ($F(5,313) = 1.500$, $p=0.189$, Welch statistic $p=0.126$) in relation to statement one or farm size ($F(2,251) = 0.835$, $p=0.435$, Welch statistic $p=0.468$) and farm type ($F(5,313) = 0.221$, $p=0.953$) in relation to statement two were found. *Post-hoc* tests indicated that significantly more large farm respondents agreed with the first statement than small farm respondents ($p=0.063$) (Dunnett's T3 test was used to account for unequal variance (SPSS, 2007)).

Table 5.6 The proportion of Kwanalu farmers who agreed with statements pertaining to farmers' responsibility for preventing and treating HIV/AIDS by farm size and farm type, 2007.

	Farm size (n=254)			**Farm type (n=319)**					
	Small (%)	Medium (%)	Large (%)	Dairy (%)	Extensive Livestock (%)	Sugar (%)	Timber (%)	Other (%)	Mixed (%)
Managing HIV/AIDS is the primary responsibility of employers.	8.0[a]	10.7	20.9**[a]	11.5	14.3	19.5	4.8	19.6	9.9
The solution to HIV/AIDS requires an integrated approach from government, business and workers	92.0	95.2	96.5	94.2	92.9	94.8	95.2	92.2	92.6

** - significant at the 5 % level of probability

a - Significantly less small farmers than large farmers felt managing HIV/AIDS is their responsibility.

Only 14% of respondents agreed with the first statement, suggesting that most farmers consider the government to be responsible for HIV/AIDS prevention and treatment in general, and that farm workers are primarily responsible for their own HIV/AIDS prevention and treatment. The proportion of farmers that agreed with the first statement increased with farm size, suggesting that relatively larger farm businesses are more likely to provide HIV/AIDS services to their employees.

More than 92% of respondents agreed with the second statement, indicating that most farmers are willing to play a role in the HIV/AIDS prevention and treatment of their workers. This suggests that the Department of Health and NGOs have an opportunity to work with Kwanalu commercial farmers towards managing HIV/AIDS amongst farm workers in the future. Projects such as the Hlokomela project could be used as models so that the smaller commercial farmers can provide effective HIV/AIDS services. These projects should be organised by concerned farmers, farmers' organisations, the Department of Health and NGOs. Projects already implemented in other provinces show that outside expertise and funding (from donor agencies, NGOs and government) are required for these projects to be successful. The following section explores Kwanalu farmers' current provision of HIV/AIDS services to their staff.

5.4 The provision of HIV/AIDS services to farm workers by respondents

Survey participants were asked to indicate which HIV/AIDS services they provide to their staff and their opinions of the importance of each of these in their strategies to manage HIV/AIDS on their farms. The three most commonly provided HIV/AIDS services by the 319 respondents that completed this question are: informal communication about HIV/AIDS prevention and treatment (provided by 79.6% of respondents); provision of transport to state health clinics (51.6%); and encouraging voluntary HIV testing and counselling (49.5%) (Table 5.7). Other HIV/AIDS services provided by respondents include: formal HIV/AIDS awareness programmes (42.0%); arranging visits by the state clinic (39.6%); arranging formal adult education programmes (31.6%); providing staff with nutritional supplements (29.1%); contributing towards life and disability insurance for staff (22.7%); providing staff with free condoms (21.8%); partially or fully providing medical aid for staff (20.6%); and providing antiretroviral medication (ARVs) for

staff (7.4%). Respondents were not asked to indicate whether each HIV/AIDS service, if provided, was available to all or only selected employees. Anecdotal information provided by several respondents who do provide ARVs to staff indicated that they only provide ARVs to selected HIV-positive workers who are long-standing farm employees in management positions or with specialised skills. Interestingly, Ellis (2006) found that "small" South African firms in other sectors of the economy do not have resources to institute expensive HIV/AIDS prevention and treatment programmes, such as providing ARVs.

Table 5.7 The three most commonly provided HIV/AIDS services by Kwanalu commercial farmers by farm type, 2007 (n = 314).

	Informal communication	Transport to clinics	Encourage voluntary testing and counselling
Dairy (%)	94.2[a]	57.7	53.8
Extensive livestock (%)	70.7**[a]	43.9	48.8
Sugar (%)	81.3	56.0	48.0
Timber (%)	65.0	45.0	40.0
Other (%)	86.3	52.9	54.9
Mixed (%)	72.5**[a]	48.8	47.5
Total (%)	79.6	51.7	49.5

** - significant at the 5 % level of probability
a - Dairy farmers utilise informal communication significantly more than extensive livestock and mixed farms.

Provision of informal HIV/AIDS education, transport to health clinics and encouraging voluntary HIV testing and counselling were not found to vary significantly with farm size, although informal education did differ by farm type ($F(5,308) = 3.033$, $p=0.011$). No significant differences were found for "transport to health clinics" and "encourage voluntary testing and counselling" by farm type (Table 5.7). *Post-hoc* tests revealed that dairy enterprises provide significantly more informal education than extensive livestock farms ($p=0.051$) and mixed farms ($p=0.034$). In particular, these three HIV/AIDS services are provided by a relatively high proportion of dairy farmers, and a relatively low proportion of extensive livestock and timber farmers. Interestingly, 62.6% of respondents who informally provide workers with HIV/AIDS information consider this to be an important component of their HIV/AIDS management strategies.

Findings presented in this section suggest that the majority of respondents are willing to provide their staff with relatively inexpensive HIV/AIDS services, such as informing workers about HIV/AIDS and providing workers with transport to health clinics. However, anecdotal comments also indicated that some respondents doubt the effectiveness of providing some of the relatively inexpensive HIV/AIDS services. For example, some respondents perceive their farm workers to be unreceptive to HIV/AIDS information provided by farmers, and others claimed that free condoms provided to their staff were not readily taken. Studies in other industries have shown that perceived stigma, discrimination, financial disadvantages, perceived employment threat, lack of support or confidentiality and a low perception of risk negatively influence the uptake of HIV/AIDS services (especially voluntary testing and counselling) (Mundy & Dickinson, 2004; Skinner & Mfecane, 2004; Connelly & Rosen, 2005). Further research that includes interviews with farm workers and rural HIV/AIDS workers is necessary to determine the extent to which these factors impact the uptake of HIV/AIDS services on commercial farms.

Commercial farmers may be unwilling to incur costs of providing workers with relatively expensive HIV/AIDS services because (a) they lack the resources to do so, and (b) they perceive this to be the responsibility of the State. The following section examines Kwanalu farmers' use of other strategies to manage HIV/AIDS on their farms.

5.5 Further strategies to manage HIV/AIDS on farms

Additional strategies commonly used by respondents to manage HIV/AIDS include (a) multi-skilling[7] workers to overcome problems of increased labour absenteeism (by 70.5% of respondents); (b) substituting labour with machinery to reduce the farms' exposure to the impact of HIV/AIDS (64.3%); (c) paying staff above-average wages to attract and retain productive staff (48.0%); (d) pre-employment screening to reduce the likelihood of employing workers with poor health (42.6%); (e) substituting permanent labour with casual labour (33.4%); and (f) outsourcing various activities to contractors to reduce farm labour requirements (33.4%)[8]. In addition, 10.7%

[7] Multi-skilling – teaching employees to do more than one job in the business, as this provides a means of dealing with the risks of worker absenteeism.
[8] The effectiveness of strategies that sample farmers used were not assessed in this study.

of respondents reported having sought medical retirement for employees exhibiting symptoms of AIDS.

Table 5.8 reports respondents' use of three of these strategies (multi-skilling workers, mechanisation, and paying above-average wages) by farm size and farm type. ANOVA results show that multi-skilling workers, mechanisation, and paying above-average wages were not found to vary significantly with farm type, although mechanisation ($F(2,247) = 3.830$, $p=0.023$, Welch statistic $p=0.021$) and paying above-average wage rates ($F(2,247) = 4.464$, $p=0.012$) did differ by farm size (Table 5.8). *Post-hoc* tests (Dunnett's T3 test) for mechanisation showed that small farms use this response significantly less than large farms ($p=0.017$). *Post-hoc* tests (the Tukey HSD test was used as there were no problems due to unequal variance or sample size (SPSS, 2007)) for above average wage rates showed that small farms utilise this response significantly less than medium ($p=0.082$) and large farms ($p=0.013$). Of the farmers that use multi-skilling as a strategy to manage HIV/AIDS, 77.6% consider it to be important for their management of HIV/AIDS. Likewise, 77.7% and 69.4% of respondents respectively who use mechanisation and pay above-average wages as HIV/AIDS management strategies consider these practices to be important for their management of HIV/AIDS. The incidence of use of all three strategies increases with farm size and varies by farm type. Multi-skilling of labour and mechanisation are relatively more common on dairy and mixed farms compared to sugar cane farms. Paying above-average wage rates[9] is relatively more common on dairy, sugar and timber farms compared to mixed and extensive livestock farms.

[9] The purpose of paying higher than average wage rates is to attract and keep good labour, as well as enabling workers access to health care. The effectiveness of this strategy was not analysed in this study.

Table 5.8 Three commonly used HIV/AIDS management strategies by Kwanalu commercial farmer by farm size and farm type, 2007.

		Multi-skilling	Mechanisation	Pay higher than average wage rates
Farm size (n=250)	Small (%)	67.8	56.3[a]	37.9[b]
	Medium (%)	67.9	65.4	54.3*[b]
	Large (%)	75.6	75.6**[a]	59.3**[b]
Farm type (n=311)	Dairy (%)	80.8	75.0	55.8
	Extensive livestock (%)	65.9	48.8	48.8
	Sugar (%)	66.7	58.7	52.0
	Timber (%)	65.0	70.0	55.0
	Other (%)	72.5	62.7	47.1
	Mixed (%)	70.0	70.0	37.5

**, * - significant at the 5 and 10 % levels of probability respectively.
a - small farms utilise mechanisation significantly less than large farms.
b - small farms pay higher than average wage rates significantly less than medium or large farms.

A feature of the comparison between provision of HIV/AIDS services and use of other HIV/AIDS management strategies is that relatively fewer farmers rank provision of HIV/AIDS services as being important to management of HIV/AIDS on their farms. This suggests that currently a high percentage of farmers perceive that the burden-shifting responses are relatively more important than HIV/AIDS prevention and treatment programmes in their overall strategies to manage HIV/AIDS on their farms.

5.6 Conclusion

The descriptive statistics presented in this chapter indicate that Kwanalu commercial farmers are both highly aware of and concerned about HIV/AIDS. Respondents' estimates of HIV prevalence amongst staff tend to be high relative to the provincial average. Most respondents tend to perceive HIV/AIDS to be impacting on current profitability and this impact will tend to grow into the future. HIV/AIDS has been perceived to increase absenteeism, decrease worker productivity and increase staff turnover rates. Respondents perceive HIV/AIDS not to be the primary responsibility of the employer, but are not averse to an integrated approach to managing HIV/AIDS in conjunction with government and employees. Responses used have tended towards the relatively inexpensive HIV/AIDS services (e.g. informal communication) and burden-shifting activities (e.g. mechanisation).

These results indicate that while Kwanalu commercial farmers perceive HIV/AIDS not to be their primary responsibility, they are willing to provide relatively inexpensive HIV/AIDS services and work with other role players to respond to HIV/AIDS. Therefore, it can be concluded that there is opportunity for NGOs and government to assist Kwanalu commercial farmers with information and resources to combat HIV/AIDS. The following chapter will discuss the socioeconomic variables related to response.

Chapter 6: Further analysis of Kwanalu commercial farmer responses to the challenges of HIV/AIDS

This section aims to further investigate commercial farmers' management responses to HIV/AIDS. It does not aim to evaluate the effectiveness of various strategies. Anecdotal information is provided in support of arguments presented in the paper (e.g. problems of securing antiretrovirals (ARVs) for workers from state clinics, problems of staff not heeding advice provided by management, etc.). A better understanding of farmers' responses will provide insight into policies and programmes that engage farm businesses to address HIV/AIDS in rural commercial farming regions.

6.1 Mean rankings of the response index

Survey respondents were required to complete a table on their perceptions of a set of HIV responses and the provision of those services to their employees. Respondents were asked three questions about each response: (1) whether or not the response is used (converted into dummy variable, yes = 1, no = 0); (2) how long the response has been used; and (3) how important the response is to managing HIV/AIDS on their farms (measured on a Likert-scale ranging from 1 (not important) to 10 (very important)). A response index was then calculated for each possible response by multiplying the responses to question 1 and question 3 (a response not used equals zero in the index).

Table 6.1 presents the index in two formats. The first is the ranking of the response used by adopters only. This shows how important respondents perceive the response is to the management of HIV/AIDS on their farms. The second format is a ranking by all respondents and will be used to calculate a general response index, as it takes into account all the respondents and the rankings of responses. The ranking by all respondents represents the "intensiveness of adoption" (i.e., how farmers rate the response in their overall management of HIV/AIDS).

The "extensiveness of adoption" (i.e., the number of farm workers targeted), however, was not measured.

Table 6.1 Number of users (N), Ranking, mean and standard deviation (SD) for the response index, HIV/AIDS study, KwaZulu-Natal, 2007.

	Ranking by all respondents				Ranking by adopters only			
	N*	**Mean**	SD	**Rank[a]**	N	**Mean**	SD	**Rank[b]**
Informal Communication	304	**5.07**	3.44	**1**	239	**6.45**	2.48	**18**
Multi-skilling of workers	290	**4.86**	3.83	**2**	198	**7.12**	2.31	**7**
Mechanisation	289	**4.53**	4.08	**3**	176	**7.44**	2.38	**4**
Encourage voluntary testing and counselling	310	**3.36**	4.02	**4**	150	**6.95**	2.92	**11**
Free transport to clinics	303	**3.34**	3.83	**5**	151	**6.71**	2.61	**15**
Pre-employment screening (employ healthy-looking applicants)	303	**3.28**	4.13	**6**	125	**7.94**	2.04	**1**
Pay higher than average wage rates	296	**3**	3.69	**7**	132	**6.72**	2.33	**14**
HIV/AIDS awareness program	308	**2.86**	3.69	**8**	130	**6.78**	2.38	**13**
Arrange visits by the state clinic	307	**2.73**	3.79	**9**	118	**7.1**	2.5	**8**
Utilise contractors more	302	**2.4**	3.72	**10**	95	**7.62**	2.01	**3**
Use more casual labour and/or have less permanent labour	302	**2.18**	3.5	**11**	94	**6.99**	2.4	**10**
Formal Adult Education	317	**2.15**	3.48	**12**	97	**7.04**	2.25	**9**
Provide nutritional supplements	308	**2.04**	3.45	**13**	87	**7.22**	2.14	**6**
Religious activities (e.g. Visits by priests)	309	**1.57**	3.23	**14**	67	**7.24**	2.67	**5**
Provide assist life and disability insurance	307	**1.39**	2.88	**15**	66	**6.47**	2.41	**17**
Provide/assist medical aid	310	**1.35**	2.95	**16**	61	**6.89**	2.45	**12**
Provide free condoms	308	**1.17**	2.71	**17**	62	**5.81**	3.09	**19**
Selective retrenchment/ Medical retirement	313	**0.71**	2.18	**18**	33	**6.7**	2.21	**16**
Provide free antiretrovirals (ARVs)	312	**0.49**	1.99	**19**	20	**7.65**	2.68	**2**

* - N varies due to missing values in the data set.
[a] - Ranking on Likert-type scale ranging from 0 (non-adoption) to 10 (high)
[b] - Ranking on Likert-type scale ranging from 1(low) to 10 (high)

Pre-employment screening (employing healthy-looking applicants) is ranked as the most important response (Table 6.1). This response is based on the perception of the health of a potential employee at the time of employment. Given the nature of HIV/AIDS, however, this does not guarantee that the employee is not HIV-positive at the time employment, although it is likely to offset the costs of HIV/AIDS to some later date (because the effects of AIDS are most apparent approximately 5 - 7 years after HIV infection). The provision of ARVs ranked second most important, although only 6% of respondents utilise this response; hence in the general

response index ARVs only rank 19th. Anecdotal information provided by respondents who provide ARVs to workers indicated that the ARVs were only provided to workers in highly-skilled positions. This may be due to a lack of resources and information.

Table 6.1 indicates that the burden-shifting responses of pre-employment screening, utilising contractors more, mechanisation and the multi-skilling of workers featured prominently in both rankings. In contrast, the HIV/AIDS services of ARVs, provision of nutritional supplements, religious activities and formal adult education are ranked high by actual adopters, but were not as important in the ranking by all respondents. This trend shows that a higher proportion of respondents are engaging in burden-shifting responses as opposed to HIV/AIDS services. Arranging visits by state health care practitioners has a similar rating in both sets of rankings (eight and nine respectively), which indicates that many farmers are using this approach and ranking it relatively high. It is postulated that providing ARVs and nutritional supplements may be relatively more resource intensive than arranging visits by the state clinic. This trend suggests that respondents may be prepared to engage in HIV/AIDS services which are not resource-intensive. Other relatively inexpensive HIV/AIDS services (informal communication, free transport to clinics, HIV/AIDS awareness programs and encouraging voluntary testing and counselling) rank high in the ranking by all respondents. This shows that these responses are widely used, though the comparative ranking by actual adopters indicates that survey respondents do not necessarily consider these responses to be relatively effective options. Anecdotal information provided by several respondents indicated that some farmers perceive their employees to be unwilling to make effective use of these services when they are provided. Interestingly, provision of free condoms to labour ranked last in both rankings. Anecdotal information provided by some respondents suggested that Kwanalu commercial farmers commonly believe that many workers are not willing to utilise condoms.

Studies in other industries have shown that perceived stigma, discrimination, financial disadvantages, perceived employment threat, lack of support or confidentiality and a low perception of risk negatively influence the uptake of HIV/AIDS services (especially voluntary testing and counselling) (Mundy & Dickinson, 2004; Skinner & Mfecane, 2004). Further research that includes interviews with farm workers and rural HIV/AIDS workers is necessary to

determine the extent to which these factors impact the uptake of HIV/AIDS services on commercial farms.

Descriptive statistics presented in this section indicate that respondents tend to favour burden-shifting activities (contractors and mechanisation) and relatively inexpensive HIV/AIDS services (arranging visits by the state clinic) in the ranking by all respondents. While the more expensive HIV/AIDS services (provision of ARVs) tend to rank highly by actual adopters, they are not ranked highly in the ranking by all respondents as only a small number of respondents are utilising them. It seems that NGOs and the Department of Health have a key role and opportunity to assist commercial farmers to provide HIV/AIDS services. The Hlokomela project is an example of a model which may be used to assist smaller commercial farmers in providing HIV/AIDS services such as ARVs and testing and counselling. The next section analyses heterogeneity amongst respondents' use of HIV responses using principal components analysis (PCA).

6.2 PCA of respondents' adoption of HIV responses

A PCA was conducted on the rankings by all respondents. The first six PCs had eigenvalues greater than one and accounted for 56% of the variance in the data (Table 6.2). Bartlett's test of sphericity was significant; therefore the sample correlation matrix did not come from a population in which the intercorrelation matrix is an identity matrix. The Kaiser-Meyer-Olkin measure of sampling adequacy is 0.766, therefore the degree of common variance among the 19 variables is high. Therefore, the PCs extracted account for a large amount of variance in the data.

Analysis of variance (ANOVA) tests were conducted on the six elicited PCs. Enterprise type and farm size were used to group the respondents for the ANOVA tests. Due to the group sizes being different under the enterprise type category, the Hochberg GT2 test (Stoline and Ury, 1979) is used for PCs 1, 2, 4, 5 and 6. Principal component 3 has unequal variance (tested using the Levene statistic) and therefore the Games-Howell test is used. The groups' sizes based on farm size are almost equal and the variance in all the principal components was found to be

homogenous, therefore Tukey's test is used (Stoline and Ury, 1979). The ANOVA tables for enterprise type and farm size are presented in Appendix C.

Table 6.2 PCA describing variation in a sample of Kwanalu farmers' rankings of various HIV/AIDS management responses, 2007 (n = 261).

Principal component	**1**	**2**	**3**	**4**	**5**	**6**
Initial eigenvalue	3.72	1.738	1.454	1.208	1.09	1.015
Percentage of variance explained (cumulative)	20.668	30.325	38.4	45.113	51.171	56.81
Responses to HIV/AIDS						
Informal Communication	0.599	-0.122	-0.34	-0.166	-0.076	-0.206
Multi-skilling workers	0.549	0.352	**-0.331**	-0.069	-0.14	-0.281
Mechanisation	0.44	0.524	-0.042	-0.11	-0.054	-0.071
Encourage voluntary testing and counselling	0.664	-0.257	-0.176	-0.078	0.072	-0.207
Free transport to clinics	0.372	-0.089	-0.246	**0.611**	-0.214	-0.204
Pre-employment screening (employ healthy-looking	0.336	0.57	0.249	-0.171	-0.311	0.123
Pay higher than average wage rates	0.38	0.392	-0.054	**0.373**	-0.099	0.302
HIV/AIDS awareness program	0.593	-0.274	-0.077	-0.19	0.242	0.19
Arrange visits by the state clinic	0.558	-0.209	-0.147	-0.005	0.143	0.192
Utilise contractors more	0.318	0.465	-0.104	0.033	0.29	-0.142
Use more casual labour and/or have less permanent	0.208	0.48	-0.175	0.121	**0.49**	0.092
Formal Adult Education	0.54	-0.338	0.079	-0.208	**0.33**	0.097
Provide nutritional supplements	0.435	-0.334	-0.126	0.131	**-0.339**	-0.091
Religious activities (e.g. visits by priests)	0.363	-0.138	-0.183	-0.114	-0.214	**0.702**
Provide/ assist life and disability insurance	0.277	0.021	**0.338**	**0.52**	0.255	0.217
Provide/assist medical aid	0.363	-0.266	**0.391**	**0.372**	-0.184	-0.072
Provide free condoms	0.419	-0.143	**0.548**	-0.012	**0.332**	-0.269
Selective retrenchment/ Medical retirement	0.401	0.237	**0.589**	-0.195	-0.184	0.001
Provide free antiretrovirals (ARVs)	0.425	-0.052	0.29	-0.22	-0.282	-0.041

Principal component one (PC1) (Table 6.2) is interpreted as a "General Response Index" to HIV/AIDS because the loadings for nearly all of the variables are greater than 0.3 and positive (Dunteman, 1989). It is used as a dependent variable in a linear regression analysis in order to estimate the significant characteristics of the respondents who respond more efficiently to HIV/AIDS. However, this index does not distinguish the type of strategies chosen as both the HIV/AIDS services and burden-shifting activities are included in this index. The ANOVA for

PC1 (Appendix C, Table C.1) indicates that there is significant variation within this PC based on enterprise type (at the 10% level of probability) and farm size (at the 5% level of probability). Dairy enterprise responses differ significantly (positively) from extensive livestock enterprises (at the 5% level of probability). This may be due to dairy enterprises having to be more aware of their employees' health and therefore responding more to the pandemic. As expected, large farms have significantly different (positive) means to small farms (at the 5% level of probability). The positive sign indicates that large farms respond more. This is consistent with *a priori* expectations as larger farmers will have access to more resources with which to respond (*ceteris paribus*).

Principal component two (PC2) (Table 6.2) is interpreted as an index of preference for "Services vs. Burden-Shifting" because the HIV/AIDS services loadings are all negative (except for the provision of life insurance at 0.021) and the burden-shifting activities loadings are all positive. A linear regression equation can then be estimated on PC2 to determine the characteristics of respondents that provide HIV/AIDS services and respondents who engage in burden-shifting activities. The ANOVA tests (Appendix C, Table C.1) indicate that there are no significant differences within this PC with regard to enterprise type or farm size.

Principal component three (PC3) shows the adoption of responses, selective retrenchment and medical retirement and provision of condoms, which rank relatively low in Table 6.1 in both rankings. Table 6.1 indicates that both of these responses have relatively few actual adopters. Principal component four (PC4) indicates the provision of medical services. These responses may be jointly or complementarily adopted. Principal component five (PC5) indicates that respondents who use casual labour tend not to use provision of nutritional supplements and pre-employment screening (which are essentially long-term strategies). However, formal adult education and provision of condoms (relatively short-term strategies) are positively correlated with the use of casual labour. PC5 indicates that respondents utilising casual or temporary labour are not investing in the long-term health and productivity of the labour. This is because temporary labour spends a relatively short period of time working on the respondent's farm and the respondent will not reap the long-term benefits of investing in casual workers' health. PC6 shows that the adoption of religious activities is largely independent of other responses.

The principal components analysis of the responses index yielded two orthogonal variables which represent (1) general response, and (2) HIV/AIDS services versus burden-shifting activities. These two principal components will now be used in an ordinary least squares regression analysis to find which respondent characteristics have a positive or negative relationship with them.

6.3 Regression analysis of the general response principal component

Table 6.3 shows the estimated regression equation of factors affecting PC1. Regression (1) is dependent on nine explanatory variables. This regression seeks to identify which respondents are responding to HIV/AIDS more; it does not indicate the type of responses being used. The coefficients of the variables range between the 1% and 5% levels of significance. In order to increase the normality of turnover, data transformation was necessary. The turnover variable is inverted. The variance inflation factor (VIF) for each of the variables in Table 6.3 does not exceed 1.308, therefore multicollinearity is not considered to be a problem in this model (Gujarati, 2003: 362). The adjusted R^2 value of 0.314 indicates that this model explains about 31% of the variation in the general response index accounted for by the explanatory variables. The F-value (a test of the overall significance of the estimated linear regression) is highly significant.

The coefficients of the variables “responsibility of the government (GRESP)”, “skilled labour as proportion of unskilled labour (LABSOT)”, “management style (MSTYLE)” and the “general cost PC (COSTPC)” are statistically significant at the 1% level of probability. The coefficients for the “Extensive livestock dummy (EXTLIVD)”, “managing HIV/AIDS requires an integrated approach from government, employers and employees (INTRESP)”, “turnover inverted (TURNINV)” and “HIV/AIDS ranked as a business concern (RANK)” are significant at the 5% level of probability.

Table 6.3 Regression analysis of the respondent characteristics that affect the general response principal component, HIV/AIDS study, KwaZulu-Natal, 2007.

Regression 1 (adjusted R^2 = 0.314) **Dependent variable: PC 1 - General Response Index** **F-value = 9.277 significance = 0.000; d.f. = 163**						
		B coefficients				
Model	**Label**	**Unstandardised**	**Std. Error**	**Standardised**	**Sig.**	**VIF**
	(Constant)	1.300	0.435		0.003***	
Managing HIV/AIDS is the responsibility of the government	GRESP	-0.422	0.140	-0.198	0.003***	1.028
Managing HIV/AIDS requires an integrated approach from government, employers and employees	INTRESP	-0.555	0.253	-0.146	0.030**	1.056
HIV/AIDS ranked as a business concern	RANK	0.066	0.029	0.164	0.026**	1.261
Management style	MSTYLE	-0.396	0.109	-0.240	0.000***	1.047
Extensive livestock dummy	EXTLIVD	-0.478	0.195	-0.165	0.016**	1.077
Skilled labour as a proportion of total labour	LABSOT	0.953	0.264	0.248	0.000***	1.120
Turnover inverted	TURNINV	-18130.268	8427.742	-0.145	0.033**	1.081
General cost PC	COSTPC	0.312	0.074	0.315	0.000***	1.308
Debt servicing	DS	0.005	0.003	0.099	0.139	1.048

Note: ***, ** denote significance at the 1and 5% levels of probability (respectively).

The estimated negative coefficient of GRESP indicates that respondents who believe that managing HIV/AIDS is the responsibility of the government, will tend to respond less to the impacts of HIV/AIDS. In contrast the estimated coefficient of INTRESP (positive coefficient) suggests that respondents who support the idea of an integrated approach are likely to have a greater response to HIV/AIDS. The estimated positive coefficient of RANK indicates that respondents who perceive HIV/AIDS as a major business concern tend to respond more, which is consistent with *a priori* expectations. The estimated negative coefficient of MSTYLE shows that the more traditional style managers are likely to respond relatively less to the impacts of HIV/AIDS. This is consistent with *a priori* expectations that human resources managers are proactive and will respond earlier with preventative strategies, while reactive traditional managers will only respond when their firm is threatened directly. Descriptive statistics presented in Chapter 5 showed that Kwanalu commercial farmers perceived that the full impact of

HIV/AIDS had not been felt yet. Therefore, this indicates that commercial farmers may be reactive rather than proactive and have yet to respond fully to the impacts of HIV/AIDS.

EXTLIVD is included in the model as a dummy variable with the benchmark category being commercial sugar cane farmers. EXTLIVD has a negative coefficient which indicates that extensive livestock farmers are responding significantly less than commercial sugar cane farmers. Earlier descriptive statistics on this sample found that commercial sugar cane and timber farmers are relatively more concerned than farmers of other enterprise types, which suggests that the former farmers will respond more. LABSOT (positive coefficient) suggests that respondents who employ a large proportion of skilled labour will respond more to the impact of HIV/AIDS. This is consistent with *a priori* expectations as the cost of recruiting and training of skilled labour is relatively high, therefore employers will seek to decrease their vulnerability to HIV/AIDS by responding to the impact.

The estimated negative coefficient of TURNINV is a transformed variable. Turnover (measured in Rands) was inverted, thus large values become small and small values become large (Osborne, 2002). This was done to increase the normality of the turnover variable. Therefore, the negative coefficient indicates that respondents with a lower turnover are responding less to the impacts of HIV/AIDS, while respondents with larger turnovers are responding more. Turnover can be used as a proxy for liquidity and therefore this observation is consistent with *a priori* expectations that farmers' responses may be constrained by the resources available to them. The estimated positive coefficient of COSTPC shows that if respondents perceive that HIV/AIDS is (or will be) increasing costs, they will respond more to HIV/AIDS. This is consistent with *a priori* expectations that if HIV/AIDS increases cost, a rational commercial farmer will attempt to decrease the impact of HIV/AIDS on costs.

The estimated coefficient of DS (significant at the 14% level of significance) has a positive coefficient which suggests that respondents who are spending a relatively large proportion of turnover on debt servicing are responding relatively more. This result suggests that respondents who perceive HIV/AIDS to be negatively affecting their debt repayment ability will respond more. DS and the individual responses were then tested using bivariate correlation. It was found that DS is positively significantly correlated with provision of condoms, formal adult education

and use of contractors. These responses are relatively lower cost items and tend to protect against some of the impacts of HIV/AIDS.

Respondents who perceive that managing HIV/AIDS requires an integrated approach from government, employers and employees; who perceive HIV/AIDS to impact on costs; who employ a high proportion of skilled labour; who have high turnovers and have high debt servicing amounts, are responding more to the impacts of HIV/AIDS. Respondents who perceive HIV/AIDS to be the responsibility of the government; who are traditional managers; who employ large amounts of temporary labour and are extensive livestock farmers, are generally low levels of response to HIV/AIDS.

6.4 Regression analysis of the HIV/AIDS services vs. burden-shifting principal component

Table 6.4 shows the OLS regression of PC2, the HIV/AIDS services vs. burden-shifting activities principal component. In regression (2) PC2 is hypothesised to be dependent on 13 explanatory variables. The analysis identifies the characteristics of respondents who revealed a clear preference for using either burden-shifting strategies or HIV/AIDS services to manage HIV/AIDS on their farms. This regression does not distinguish between the particular types of HIV/AIDS services or burden-shifting activities being used. Positive coefficients will indicate that the characteristic favours the utilisation of burden-shifting activities, while a negative coefficient implies that the variable favours the utilisation of HIV/AIDS services. In terms of significance, variable coefficients range between the 1% and 5% levels of significance. Similar to regression one it was necessary to transform certain variables. The transformations included in this model are the square root of age, natural log of turnover and the principal components conducted on the perceptions of costs (Appendix D). The VIF for each variable does not exceed 2.109 therefore multicollinearity is not considered to be a problem in this model. The adjusted R^2 value of 0.366 indicates that this model explains about 37% of the variation in the PC2 accounted for by the explanatory variables. The F-value is highly significant.

Table 6.4 Regression two: HIV/AIDS services vs. burden-shifting activities PC, HIV/AIDS study, KwaZulu-Natal, 2007.

Regression 1 (adjusted R^2 = 0.366) **Dependent variable: PC 2 - HIV/AIDS services vs. burden-shifting activities** **F = 7.626 significance = 0.000; D.F. = 149**						
		B coefficients				
Variables	**Label**	**Unstandardised**	**Std. Error**	**Standardised**	**Sig.**	**VIF**
	(Constant)	0.102	1.407		0.942	
Square root of age	AGESQRT	-0.209	0.099	-0.164	0.037**	1.427
Distance from town	NEART	0.003	0.001	0.137	0.042**	1.061
Is the amount of labour decreasing in your area	DECL	0.593	0.149	0.286	0.000***	1.224
HIV/AIDS is the responsibility of employers	ERESP	-0.627	0.227	-0.191	0.007***	1.135
HIV/AIDS ranked as a business concern	RANK	-0.067	0.028	-0.170	0.020**	1.230
Legal structure - Company	COMP	0.808	0.232	0.253	0.001***	1.252
Total labour	LABT	-0.008	0.002	-0.492	0.000***	2.109
Unskilled labour as a proportion of total labour	LABUOT	-0.950	0.291	-0.268	0.001***	1.594
Skilled labour as a proportion of total labour	LABSOT	-0.900	0.334	-0.236	0.008***	1.817
Managing experience	MANCFINV	-2.695	1.129	-0.179	0.018**	1.329
Medical vs. Retirement factor	MRPC	-0.145	0.066	-0.150	0.030**	1.111
Natural log of turnover	TURNLN	0.192	0.074	0.227	0.010***	1.796
Debt asset ratio	DA	-0.006	0.002	-0.171	0.014**	1.116

Note: ***, ** denote significance at the 1% and 5 % levels of probability (respectively).

The legal structure dummy (COMP), HIV/AIDS has negatively affected the amount of labour available in your area (DECL); managing HIV/AIDS is the primary responsibility of employers (ERESP); natural log of turnover (TURNLN); unskilled labour as a proportion of total labour (LABUOT); skilled labour as a proportion of total labour (LABSOT) and the labour total (LABT), are all significant at the 1% level of probability (Table 6.4). Medical vs. retirement PC (MRPC); HIV/AIDS ranked as a business concern (RANK); years managing current farm (EXP); distance from town (NEART); square root of age (AGESQRT) and the debt: asset ratio (DA) are all significant at the 5% level of probability.

The estimated negative coefficient of AGESQRT shows that generally older respondents will use HIV/AIDS services. It is postulated that this may be due to older respondents having more established enterprises and, therefore, the liquidity to invest in HIV/AIDS services. NEART has a positive coefficient which indicates that respondents situated a long way from a town tend to use burden-shifting activities. NEART can also be considered as a proxy variable for distance to a clinic or other medical facility. Therefore, respondents who are further away from towns may find it more cost-effective to use burden-shifting strategies as opposed to HIV/AIDS services.

The estimated positive coefficient of DECL signifies that respondents who perceive HIV/AIDS to be negatively affecting the amount of labour available in their area are using burden-shifting strategies. These strategies are likely to consist of outsourcing of jobs and mechanisation. This is due to HIV/AIDS decreasing the amount of labour available and therefore increasing the cost of recruiting new labour. This effect of increasing the cost of labour makes the use of mechanisation and outsourcing of jobs more cost-effective. Sparrow *et al.* (2008) found that increased cost of labour (through labour legislation) led to rising demand for machinery, chemicals and contractors. In contrast, the negative coefficient of ERESP shows that respondents who perceive that employers are responsible for managing HIV/AIDS tend to use HIV/AIDS services to manage HIV/AIDS on their farms. Descriptive statistics in Chapter Five found that employers who regarded themselves as responsible for managing HIV/AIDS tended to be relatively large commercial farms. The negative coefficient of RANK shows that respondents who rank HIV/AIDS highly as a business concern tend to use HIV/AIDS services as a management response.

The COMPANY variable has a positive coefficient which indicates that companies are more likely to use burden-shifting activities than sole proprietorships. This may reflect that farmers who have structured their businesses as private companies may have larger farms (more resources) and are more able to invest in burden-shifting activities such as mechanisation. This supports King's (2005) contention that, with the exception of large agribusiness firms, most commercial farming units in South Africa are too small to be able to afford sophisticated AIDS programmes for farm workers.

LABT is calculated by adding the number of unskilled, skilled, temporary and outsourced labour. The negative estimated coefficient for LABT signifies that respondents who employ high numbers of labour are more likely to use HIV/AIDS services. This may be due to the cost of labour not yet rising above the cost of mechanisation, or there may not be technology available to replace the labour. Organisations with a larger workforce may also be taking advantage of economies of size and spreading the fixed cost of providing HIV/AIDS services over a large number of workers. This means that average fixed cost of the HIV/AIDS services per worker is lower. Similarly, the negative coefficients for LABUOT and LABSOT reveal that respondents who employ a large amount of permanent labour are more likely to utilise HIV/AIDS services. This is consistent with regression (1) which indicates that respondents with a large proportion of temporary labour are likely to respond less than respondents with high a proportion of permanent labour. This is consistent with the expectation that commercial farmers will reap the benefit of providing HIV/AIDS services to permanent labour. This is an interesting result from a policy point of view as it indicates that respondents with labour-intensive enterprises are using HIV/AIDS services. These respondents could be targeted by the Department of Health and NGOs to provide resources and information on HIV/AIDS services to encourage this trend.

MRPC is a PC which shows that respondents who favour providing medical benefits tend not to give retirement benefits. Therefore, the negative coefficient for this variable is expected as respondents are investing in their labourers' current health (using HIV/AIDS services) in order to keep them productive and at work. TURNLN (positive coefficient) indicates that respondents with larger turnovers are more likely to utilise burden-shifting activities. Due to the natural log transformation, this effect is increasing at a decreasing rate. DA has a negative coefficient which indicates that respondents with a high debt: asset ratio may not be liquid enough to utilise burden-shifting response and will, therefore, try and manage the impact of HIV/AIDS by using the less resource-intensive HIV/AIDS services (such as informal communication).

Respondents who perceive HIV/AIDS to be impacting on labour availability; who own companies; who are a long distance from towns; who have dairy enterprises and high turnovers, are generally using burden-shifting activities to manage HIV/AIDS. Respondents who employ large amounts of labour (particularly permanent labour), who perceive HIV/AIDS as the responsibility of employers, who are older and more experienced, and have a relatively high debt: asset ratio tend to use HIV/AIDS services to manage the impacts of HIV/AIDS.

Conclusion

The descriptive statistics presented in this study indicate that Kwanalu commercial farmer members are concerned about HIV/AIDS. The majority of respondents believe that HIV/AIDS has impacted negatively on the profitability of their businesses and that this impact is likely to grow in the future. A majority of respondents believe that HIV/AIDS has negatively impacted on labour absenteeism, labour productivity and staff turnover rates. Respondents rank burden-shifting activities (use of contractors and mechanisation) and relatively inexpensive HIV/AIDS services (arranging visits by the state clinic) high in the ranking by all respondents. While the more expensive HIV/AIDS services (provision of ARVs) are highly ranked by actual adopters, they are not ranked high in the ranking by all respondents as only a small number of respondents are utilising them.

Results suggest that commercial farmers who are responding more to HIV/AIDS are those who perceive HIV/AIDS to impact on costs, who employ more skilled labour, who have high turnovers and who have high debt-servicing obligations. Low responders perceive HIV/AIDS management to be the responsibility of the government; are traditional managers; employ large numbers of temporary labour; and have relatively low labour intensive enterprises (e.g. extensive livestock farmers). Low responders show that they are either unaffected by or unaware of HIV/AIDS's potential impacts – or are of the opinion that it is not their responsibility. This may be due to a lack of information on the impacts of HIV/AIDS and HIV/AIDS services. Conversely, respondents who employ large amounts of temporary labour can be regarded as managing HIV/AIDS, because it is easier to discontinue the employment of temporary labour than permanent labour. These respondents may already be insulated from the impacts of HIV/AIDS. However, this is a response which shifts the burden to the employees and the government.

Respondents who perceive HIV/AIDS to be impacting on labour availability, who own companies; who are a long distance from towns and have dairy enterprises and high turnovers, are generally using burden-shifting activities to manage HIV/AIDS. Conversely, respondents

who employ large numbers of labour (particularly permanent labour); who perceive HIV/AIDS as the responsibility of employers; who are older and more experienced; and who have a relatively high debt: asset ratio, tend to use HIV/AIDS services to manage the impacts of HIV/AIDS. The characteristics of respondents using HIV/AIDS services are encouraging as these respondents are employing large proportions of skilled labour and are attempting to keep them productive instead of using burden-shifting activities. Respondents with high debt: asset ratios may be utilising relatively inexpensive HIV/AIDS services (such as informal communication and encouraging voluntary testing and counselling) because they do not have the resources and information to provide more resource-intensive HIV/AIDS services (such as providing ARVs). This presents an opportunity for government to get involved with commercial farmers by providing resources and information to commercial farmers and their employees to combat HIV/AIDS. The trend of respondents with high turnovers and the respondents who perceive burden-shifting activities to be more efficient in managing HIV/AIDS, also need to be targeted by the Department of Health and NGOs to change their perceptions and assist in delivering HIV/AIDS service solutions to their employees.

Kwanalu farmers' responses to HIV/AIDS are likely to focus on strategies that reduce the exposure of their farm to HIV/AIDS (e.g. substituting labour with machinery and outsourcing production activities to contractors, multi-skilling staff and substituting permanent workers with casual workers to overcome problems of increased labour absenteeism, and offering above-average wages to attract and retain productive staff). Although some of these strategies benefit farm workers, others merely shift the burden of HIV/AIDS to contractors, the workers' families and the state. These strategies do not contribute towards preventing or treating HIV/AIDS amongst farm workers.

Kwanalu members are less inclined to provide services that contribute towards preventing HIV/AIDS for three reasons. Firstly, farmers are unwilling to provide these services because they believe that the state is responsible for incurring the costs of HIV/AIDS prevention and treatment programmes. Secondly, provision of some HIV/AIDS services is relatively expensive and many farmers lack the resources to provide them to their staff. Thirdly, farmers doubt the receptiveness of their staff to HIV/AIDS information from various sources, including themselves.

However, the vast majority of farmers indicated that they are willing to work together with government towards ensuring effective provision of HIV/AIDS services. Evidence of this was also provided by anecdotal information which showed that many farmers welcomed HIV/AIDS educators onto their farms to spread awareness and encourage workers to determine their HIV status.

A review of HIV/AIDS projects run by NGOs in other provinces of South Africa suggests that NGOs (and other organisations) have an important role to play in combating HIV/AIDS in commercial farming areas because they can offer expertise that may be otherwise unavailable on farms. Furthermore, these projects suggest that farm workers are receptive to HIV/AIDS programmes administered by trustworthy, independent third parties. Finally, it is apparent from these projects and the TSB Sugar RSA Ltd. Project that there are significant economies of size in establishing and operating HIV/AIDS projects for farm workers. Increased provision of HIV/AIDS programmes and projects by the state or NGOs in commercial farming areas of KwaZulu-Natal is therefore of particular importance for improving provision of HIV/AIDS services to farm workers on commercial farm businesses, and in particular on smaller farm businesses. Importantly, successful HIV/AIDS projects on commercial farms are likely to reduce the extent to which farmers adopt burden-shifting HIV/AIDS management responses.

Kwanalu may play an important role in promoting and facilitating the establishment of HIV/AIDS projects in commercial farming areas of KwaZulu-Natal. Kwanalu could lobby government and NGO's to provide HIV/AIDS services to commercial farms. These services could include mobile clinics for commercial farms, especially those that which are located a long way from towns or major centres. It may also identify suitable NGOs to administer these projects, and identify farm businesses that are receptive to and likely to cooperate with projects that offer HIV/AIDS services to their farm workers.

This study does not discriminate between high-resource-dependent and low-resource-dependent HIV/AIDS services. Further analysis of respondents who use HIV/AIDS services needs to be conducted to determine the characteristics of respondents who use high- and low-resource HIV/AIDS services. As this study was focussed mainly on owner-farmers and their perceptions

of, and likely responses to, the HIV/AIDS pandemic in KZN, further research could also include in-depth case studies of the HIV/AIDS strategies used by large farming operations (companies) and the costs and benefits of their approaches. Such case studies could further inform policymakers and NGOs which could lead to more flexible and effective prevention and treatment programmes.

Summary

It has been 25 years since the beginning of the HIV/AIDS pandemic. There has been much research into the macro effects and the micro effects (rural household level) of HIV/AIDS. However, there is minimal research on the effects of HIV/AIDS at the institutional level. This has been attributed to the sensitivity of the issue and businesses not wanting to release confidential information on their labour forces to the public. At the macro level the effects have been well documented. It has been suggested that there will be a drop in GDP per capita of 0.15% to 2.67% per annum. Similarly, the research into the micro effects of HIV/AIDS postulates a decrease in incomes through increased expenses, and therefore an increase in poverty. At the institutional level a case study approach has been used for several studies, and results have shown that labour costs could increase by up to 6% of the wage bill. However, these studies are not representative samples of institutions across southern Africa.

HIV/AIDS affects susceptible and vulnerable businesses by decreasing productivity, increasing costs and therefore decreasing overall profitability. Declining productivity is caused by increased absenteeism and increased organisational disruption (increased staff turnover, loss of skills and loss of productivity of infected employees and new recruits.). Increased costs are caused by increasing recruitment, training costs, health and medical costs. The law in South Africa protects HIV/AIDS-infected workers from discrimination in the workplace and essentially all workers must be treated the same. However, if an employee becomes too sick to work the contract may be terminated if employees are no longer able to carry out their job descriptions. Employers are, however, urged to find other solutions rather than dismissal. Essentially, the law provides that employers must provide a healthy working environment for the employees. The ILO (2001) released a paper on key principles for any workplace prevention programmes. These principles again urge employers to provide a healthy working environment free from discrimination, in which all employees are treated fairly.

For institutions where the effects of HIV/AIDS have become a business concern, there are four responses open to employers. These responses are prevention programmes, treatment programmes, training programmes and burden-shifting activities. The first three responses are

cost-delaying responses where the company bears some of the HIV/AIDS burden. Burden-shifting responses are utilised generally by small companies without the capital and/or willingness to pay for the above programmes, and the cost burden is shifted to the government, NGOs, communities and employees. It has been suggested by many researchers that a successful response to HIV/AIDS requires an integrated approach both up and down the supply chain, and by the aforementioned participants.

The focus of this study is on commercial agriculture in KZN and on the awareness, perceptions, responses and relative effectiveness of those responses which farmers are using. It has been postulated that there is a series of events over time which all farmers must go through. These events are awareness (farmers must be aware of the problem), perception (farmers must perceive HIV/AIDS as a problem worth solving) and response (farmers must respond). These events have been studied by using a census postal survey of Kwanalu members.

Descriptive statistics discussed in this study have shown that Kwanalu commercial farmers are concerned about HIV/AIDS. Respondents perceive HIV/AIDS to have negatively affected current and future profitability, labour absenteeism, labour productivity and staff turnover rates. Burden-shifting activities (use of contractors and mechanisation) and inexpensive HIV/AIDS services (such as arranging visits by the state clinic) are ranked high in the general response ranking. In contrast, the expensive HIV/AIDS services (provision of ARVs) tend to be ranked high only by actual adopters.

Socioeconomic variables significantly related to level of response are: the perceived impact of HIV/AIDS on costs; the number and type of labour employed; size of turnover; debt-servicing obligations; who respondents believe is responsible for managing HIV/AIDS; management style; and the level of labour-intensiveness of an enterprise. Socioeconomic variables significantly related to type of response (HIV/AIDS services or burden-shifting activities) are: the perceived impact of HIV/AIDS on labour availability; the legal structure of the farm; distance from town; enterprise type; size of turnover; number of labourers (particularly permanent labour); who respondents believe is responsible for managing HIV/AIDS; age; experience and debt: asset ratio. The relationships of the socioeconomic variables to the level of responses and type responses

indicate that there is an opportunity for government and NGOs to assist farmers with resources and information to combat HIV/AIDS.

Kwanalu farmers' responses to HIV/AIDS are likely to focus on strategies that reduce the exposure of their farm to HIV/AIDS. Some of these strategies benefit farm workers (such as paying higher than average wage rates), while others merely shift the burden of HIV/AIDS to contractors, the workers' families and the state (such as mechanisation and the outsourcing of jobs to contractors). These strategies do not contribute towards preventing or treating HIV/AIDS amongst farm workers. Farmers may be unwilling to provide HIVAIDS services because: they believe that the state is responsible for incurring the costs of HIV/AIDS prevention and treatment programmes; provision of some HIV/AIDS services is relatively expensive and many farmers lack the resources to provide them to their staff; and farmers doubt the receptiveness of their staff to HIV/AIDS information from various sources, including themselves. However, the vast majority of farmers indicated that they are willing to work together with government towards ensuring effective provision of HIV/AIDS services.

Kwanalu may play an important role in promoting and facilitating the establishment of HIV/AIDS projects in commercial farming areas of KwaZulu-Natal. For example, Kwanalu can lobby the State, amongst other sources, to fund these projects. It may also identify suitable NGOs to administer these projects, and identify farm businesses that are receptive to and likely to cooperate with projects that offer HIV/AIDS services to their farm workers. Kwanalu can also inform its members about successful HIV/AIDS programmes and projects for commercial farm workers and the factors that contributed to the success of these projects.

This research does not discriminate between the high-resource-dependent and low-resource-dependent HIV/AIDS services. Further analysis of respondents who use HIV/AIDS services needs to be conducted to determine the characteristics of respondents who use high- and low-resource HIV/AIDS services. This research does not discriminate between the high-resource-dependent and low-resource-dependent HIV/AIDS services. Further analysis of respondents who use HIV/AIDS services needs to be conducted to determine the characteristics of respondents who use high- and low-resource HIV/AIDS services. Further analysis is required of those

respondents who use HIV/AIDS services (using a case study approach), and focus group studies and interviews need to be conducted with employers, employees and members of government in order to understand what services are available, and which are viable for commercial farmers to use cost efficiently.

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Appendix A: Cost per HIV/AIDS-infected worker at a sugar mill

Table A.1. Data used for Figure 1.2: Cost per HIV/AIDS-infected worker at a sugar mill.

	Replacement Workers	Lost Productivity	Training	Hospitalisation	Clinic and Physician visits	Lost Wages	Total
% of Total cost	28	28	5	1	10	28	100
Cost (R)	2328.64	2350	400	102	846	2437.09	8463.73

Source: Morris *et al.* (2000)

Appendix B: Survey questionnaire

UNIVERSITY OF KWAZULU-NATAL

SCHOOL OF AGRICULTURAL SCIENCES AND AGRIBUSINESS

DISCIPLINE OF AGRICULTURAL ECONOMICS

QUESTIONNAIRE:

IMPACTS OF HIV/AIDS ON COMMERCIAL AGRICULTURE IN KWAZULU – NATAL

TO BE ANSWERED BY THE **PRINICIPAL** DECISION-MAKER OF THE FARM BUSINESS

YOUR SURVEY RESPONSES WILL BE KEPT STRICTLY CONFIDENTIAL.

PLEASE RETURN THE QUESTIONNAIRE (EVEN IF YOU HAVE NOT COMPLETED ALL THE QUESTIONS).

PLEASE RETURN THE SURVEY BEFORE THE 15 MAY 2007.

THANK YOU FOR PARTICIPATING IN THE STUDY.

Section 1 Farm Operator Information

1.1 Age:_____

1.2 What is the highest formal education achieved by the principal farm decision-maker?

(Please tick appropriate box)	
STD 5 and below (Grade 7 and below)	
STD 6 – 9 (Grade 8 – 11)	
Matric (Grade 12)	
Diploma	
Undergraduate Degree (e.g. BSc Agric)	
Post graduate degree (e.g. MSc Agric)	

1.3 How many years' experience do you have at:

1.3.1 Managing a farm? _____Years

1.3.2 Managing your current farm? _____Years

1.4 What is the legal structure of your farm business: (tick where appropriate)

Sole proprietorship	Partnership	Trust	Close Corporation	Company	Other (specify):

Section 2 Farm Information

2.1 What is the postal code of your district? _____

How far is your farm from the nearest urban centre (large town or city) (km)? _____Km

2.2 How far away is your main labour source (township or location) (km)? _____Km

2.3 What percentage of gross farm income is contributed by the following enterprises? (include all farms owned by your business)

Enterprise	Dairy	Beef	Veg	Sugar Cane	Timber	Fruit	Sheep/ goats	Poultry	Game Farm	Pigs	Maize	Other Specify:
%												

2.4 Labour force characteristics

Please fill out the following table regarding your labour force for the **2006/07** financial year.

Skilled labour = labour who have skills or learnt skills on your farm which are relatively difficult to replace (i.e. require training; e.g. tractor drivers, dairy staff, etc.).

		Permanent			Non-Permanent	
	Particulars	**Unskilled**	**Skilled** (e.g. tractor driver, dairy staff etc…..)	**Manager**	**Temporary or seasonal labour**	**Labour outsourced through contractors**
1	Number of people employed.					
2	% of workforce which have left the workforce during the past year due to poor health or death.					
3	% of workforce which have undergone voluntary testing for HIV/AIDS.					
4	% of workforce which have revealed their HIV/AIDS-positive status to you.					
5	% of workforce suspected to be HIV/AIDS-positive.					

Section 3 Farmer's decisions and perceptions of HIV/AIDS

3.1.1 Please provide **Your** perceptions of HIV/AIDS (Please Tick the appropriate block).

1	HIV/AIDS is a challenge to agriculture in SA?	Yes	No	Unknown
2	HIV/AIDS has affected agriculture in your area.	Yes	No	Unknown
3	Have you attended a seminar on the impact of HIV/AIDS on the workforce of the farm business?	Yes	No	
4	HIV/AIDS has had a negative impact on your farm's productivity.	Yes	No	Unknown
5	HIV/AIDS is a threat to your farm's profitability.	Yes	No	Unknown
6	HIV/AIDS has negatively affected the amount of labour available in your area.	Yes	No	Unknown
7	HIV/AIDS has affected farm enterprise combinations in your area.	Yes	No	Unknown
8	Managing HIV/AIDS is the primary responsibility of the government.	Yes	No	Unknown
9	Managing HIV/AIDS is the primary responsibility of employers.	Yes	No	Unknown
10	Managing HIV/AIDS is the primary responsibility of employees.	Yes	No	Unknown
11	The solution to HIV/AIDS requires an integrated approach from government, business and workers.	Yes	No	Unknown

3.1.2 Please indicate **your** perception of the impact of HIV/AIDS on the following factors on **your farm** since 2002. (Please tick the appropriate block)

1	Labour absenteeism on your farm.	None	Small	Moderate	Large	Don't Know
2	Labour productivity.	None	Small	Moderate	Large	Don't Know
3	Rate of death in service of your current workers.	None	Small	Moderate	Large	Don't Know
4	Early retirement of your workers.	None	Small	Moderate	Large	Don't Know
5	Staff turnover in your business.	None	Small	Moderate	Large	Don't Know
6	The amount of sick leave taken by your	None	Small	Moderate	Large	Don't Know
7	Loss of experience and vital skills.	None	Small	Moderate	Large	Don't Know

3.1.3 How has HIV/AIDS affected the following cost items with respect to **YOUR** labour costs since **2002** (please tick the appropriate block). **If the cost does not apply to you tick N/A (not applicable).**

	Cost	**N/A**	**Costs have not changed**	**Costs have increased**	**Costs have substantially increased**
1	Sick leave and/or additional sick leave (paid or unpaid).				
2	Managerial time required to focus on HIV/AIDS-related issues.				
3	Loss in production due to unfilled vacancies of temporary/casual labour				
4	Loss in production due to unfilled vacancies of unskilled labour.				
5	Loss in production due to unfilled vacancies of skilled labour.				
6	Recruitment of temporary/ casual labour.				
7	Recruitment of unskilled permanent labour.				
8	Recruitment of skilled permanent labour.				
9	Training of skilled permanent labour.				
10	Retirement benefits offered to unskilled permanent labour.				
11	Retirement benefits offered to skilled permanent labour.				
12	Medical care offered to unskilled permanent labour.				
13	Medical care offered to skilled permanent labour				
14	Death and disability benefits offered to unskilled permanent labour				
15	Death and disability benefits offered to skilled permanent labour				

3.1.4 Please rank the importance of HIV/AIDS as a concern for your business out of 10 (1 = not important and 10 = very important). _____

3.1.5 When did you first become aware of HIV/AIDS as a threat to agriculture?

_____ years ago

3.1.6 When did you start to perceive HIV/AIDS as a threat to your farm business?

_____ years ago

3.2 Please complete the following table about the **responses to HIV/AIDS** on **YOUR farm**. In Column A please tick the appropriate answer. Column C is a scale of how much of the response is due to HIV/AIDS or due to other factors (e.g. labour laws, TB, new technologies).

The Example row shows the farmer is using response Y, the response has been used for 4 years to combat HIV/AIDS and the farmer considers the response important (7/10) to managing HIV/AIDS on his farm. **ONLY ANSWER ROWS IN COLUMNS B and C IF YOU ANSWER 'YES' TO ANY ROW IN COLUMN A.**

	A.		B	C									
Management Response	Do **you currently** use this response to **combat HIV/AIDS?**		If **yes**, how many **YEARS AGO** did **YOU start** using this response to **combat HIV/AIDS?**	If **yes**, on a scale of **1-10** indicate the importance of the response to managing HIV/AIDS on your farm. (1 = not important; 10 = very important)									
E.g. Response Y	Yes	No	4 years	1	2	3	4	5	6	7	8	9	10
1. HIV/AIDS programmes			Years										
Formal Adult Education	Yes	No		1	2	3	4	5	6	7	8	9	10
Informal Communication	Yes	No		1	2	3	4	5	6	7	8	9	10
Provide nutritional supplements	Yes	No		1	2	3	4	5	6	7	8	9	10
Provide free condoms	Yes	No		1	2	3	4	5	6	7	8	9	10
Religious activities (eg. Visits by priests)	Yes	No		1	2	3	4	5	6	7	8	9	10
HIV/AIDS awareness program	Yes	No		1	2	3	4	5	6	7	8	9	10
Encourage voluntary testing and counselling	Yes	No		1	2	3	4	5	6	7	8	9	10
Provide free antiretrovirals	Yes	No		1	2	3	4	5	6	7	8	9	10
Provide/assist medical aid	Yes	No		1	2	3	4	5	6	7	8	9	10
Provide/ assist life and disability insurance	Yes	No		1	2	3	4	5	6	7	8	9	10
Arrange visits by the state clinic	Yes	No		1	2	3	4	5	6	7	8	9	10
Free transport to clinics	Yes	No		1	2	3	4	5	6	7	8	9	10

2. Do you multi-skill your workers?	Yes	No		1	2	3	4	5	6	7	8	9	10
3. Mechanisation	Yes	No		1	2	3	4	5	6	7	8	9	10
4. Do you use more casual labour and/or have less permanent labour?	Yes	No		1	2	3	4	5	6	7	8	9	10
5. Do you do pre-employment screening (e.g. employ only healthy-looking applicants)	Yes	No		1	2	3	4	5	6	7	8	9	10
6. Do you practise selective retrenchment/ medical retirement?	Yes	No		1	2	3	4	5	6	7	8	9	10
7. Do you alter employment contracts?	Yes	No		1	2	3	4	5	6	7	8	9	10
8. Do you cut medical/retirement benefits?	Yes	No		1	2	3	4	5	6	7	8	9	10
9. Do you utilise contractors more?	Yes	No		1	2	3	4	5	6	7	8	9	10
10. Do you pay higher than average wage rates?	Yes	No		1	2	3	4	5	6	7	8	9	10

Section 4 Farm Financial Characteristics

The following questions are about your farm's current financial status**. All this information will be kept strictly confidential.**

4.1 Please indicate your gross farm income (turnover) for the 2006/07 financial year.
R_____

4.2 What is the DEBT to ASSET ratio of the farm business (DEBT = Instalments, Acc's Payable, Overdraft, Mortgage bond) (ASSETS = Cash in hand + Bank, Vehicles, Machinery + Equipment, Land + Buildings)? (i.e. Debts/Assets x 100). _____%

4.3 Approximately what percentage of annual gross farm income is spent on debt servicing (repayment of capital + Interest)? _____%

4.4 What percentage of annual gross farm income is spent on HIV/AIDS prevention and/or treatment for labour? _____%

4.5 Do you have any off-farm employment (Y/N)? _____
IF YES, what proportion of your time is spent in this employment?_____

4.6 How has HIV/AIDS affected your farm's annual profit since 2002? (Please tick the appropriate block).

More than 5% lower	Between 2.5% - 5% lower	Between 0% - 2.5% lower	No Impact

4.7 How will HIV/AIDS affect your farm's profit in 5 years' time? (Please tick the appropriate block)

More than 5% lower	Between 2.5% - 5% lower	Between 0% - 2.5% lower	No Impact

Section 5 Farmer's attitudes towards risk and managerial style.

5.1 For the following statements please circle the number which indicates **your** answer as indicated by the scale below (1= strongly disagree, 3 = neutral, 5 = strongly agree):

5.1 I regard myself as the kind of farmer who takes more risks than the average.	**1**	**2**	**3**	**4**	**5**
5.2 I would rather take more of a chance on making a big profit than be content with a smaller but less risky profit.	**1**	**2**	**3**	**4**	**5**
5.3 It is good for a farmer to take risks when he knows his chance of success is fairly high.	**1**	**2**	**3**	**4**	**5**
5.4 Farmers who are willing to take risks usually do better financially.	**1**	**2**	**3**	**4**	**5**
5.5 Farm businesses often fail because managers take unnecessary risks.	**1**	**2**	**3**	**4**	**5**

5.2 Please rate the following statements **(A-D)** regarding your managerial style (**this section indicates how you deal with staff below the managerial level**). (1 = Highly disagree; 3 = neutral; 5 = Highly agree).

A	I usually supervise my labour closely.	1	2	3	4	5
B	Most of my labour does not have the ability to solve their own	1	2	3	4	5
C	I frequently allow my labour to draw up their own work plans.	1	2	3	4	5
D	Most of my labour prefer not to have extra responsibility.	1	2	3	4	5
E	I always strive to create a happy working climate for my staff.	1	2	3	4	5

Section 6

6.1 How has HIV/AIDS affected **your demand** for labour (with respect to the total number of people employed by your farm business)? (Please tick the appropriate block)

Greatly reduces demand	Moderately reduces demand	No impact	Moderately increases demand	Greatly increases demand

6.2 If you have implemented HIV/AIDS programmes, has discrimination and/or stigma (from within your labour force) had a **negative impact** on the implementation and effectiveness of these programmes (e.g. participation and take-up rates)? (Please tick the appropriate box)

No Impact	Small impact	Moderate impact	Large Impact

6.3 If you have instituted HIV/AIDS prevention and treatment strategies in the past and since discontinued them, please provide the details of those strategies and the reason for their discontinuation. (If the space provided is not sufficient please attach additional pages.)

_____
_____
_____
_____
_____
_____

6.4 If you have any additional comments with regard to HIV/AIDS on your farm that you would like to make, please do so below.

_____
_____
_____
_____
_____
_____
_____

6.5 If you have used any HIV/AIDS prevention and treatment strategies on your farm and you would like to participate in a **Case Study,** please leave your name and contact details below.

Name: _____ Phone: _____

Email: _____

THANK YOU FOR PARTICIPATING IN THE SURVEY

Appendix C: ANOVA of PC1 and PC2

Table C.1. ANOVA table with enterprise type as the grouping variable, HIV/AIDS study, KwaZulu-Natal, 2007.

		Sum of Squares	df	Mean Square	F	Sig.
PC1	Between Groups	10.205	5	2.041	2.084	.068
	Within Groups	245.795	251	.979		
	Total	256.000	256			
PC2	Between Groups	4.100	5	.820	.817	.538
	Within Groups	251.900	251	1.004		
	Total	256.000	256			
PC3	Between Groups	16.477	5	3.295	3.453	.005
	Within Groups	239.523	251	.954		
	Total	256.000	256			
PC4	Between Groups	5.490	5	1.098	1.100	.361
	Within Groups	250.510	251	.998		
	Total	256.000	256			
PC5	Between Groups	9.846	5	1.969	2.008	.078
	Within Groups	246.154	251	.981		
	Total	256.000	256			
PC6	Between Groups	5.924	5	1.185	1.189	.315
	Within Groups	250.076	251	.996		
	Total	256.000	256			

Table C.2. ANOVA table with farm size as the grouping variable, HIV/AIDS study, KwaZulu-Natal, 2007.

		Sum of Squares	df	Mean Square	F	Sig.
PC1	Between Groups	7.557	2	3.778	3.935	.021
	Within Groups	192.984	201	.960		
	Total	200.540	203			
PC2	Between Groups	1.267	2	.633	.634	.532
	Within Groups	200.917	201	1.000		
	Total	202.184	203			
PC3	Between Groups	11.787	2	5.894	6.203	.002
	Within Groups	190.977	201	.950		
	Total	202.764	203			
PC4	Between Groups	2.176	2	1.088	1.035	.357
	Within Groups	211.286	201	1.051		
	Total	213.462	203			
PC5	Between Groups	3.159	2	1.580	1.569	.211
	Within Groups	202.369	201	1.007		
	Total	205.529	203			
PC6	Between Groups	3.025	2	1.513	1.519	.221
	Within Groups	200.143	201	.996		
	Total	203.168	203			

Appendix D: PCA conducted on respondents' perceptions of HIV/AIDS impact on labour costs

A principal components analysis was conducted on respondents' perceptions of HIV/AIDS impact on labour costs. The first three PCs had eigenvalues greater than one and accounted for 65% of the variance in the data. Bartlett's test of sphericity was significant; therefore the sample correlation matrix did not come from a population in which the intercorrelation matrix is an identity matrix. The Kaiser-Meyer-Olkin measure of sampling adequacy is 0.837; therefore the degree of common variance among the 15 variables is very high. Therefore the PCs extracted account for a large amount of variance in the data. For the purpose of this paper only the first three PCs are presented (Table D.1).

Table D.1 Principal Components describing variation in a sample of Kwanalu farmers' perceptions of HIV/AIDS impact on various labour costs, 2007 (n = 322).

Principal component	1	2	3
Initial eigenvalue	6.44	1.92	1.38
Percentage of variance explained (cumulative)	42.96	55.79	64.99
Labour costs			
Sick leave and/or additional sick leave (paid/unpaid)	0.612	-0.061	0.200
Managerial time required to focus on HIV/AIDS-related issues	0.560	0.132	0.350
Loss in production due to unfilled vacancies of temporary/casual labour	0.709	**-0.479**	0.084
Loss in production due to unfilled vacancies of unskilled labour	0.708	**-0.464**	0.066
Loss in production due to unfilled vacancies of skilled labour	0.709	**-0.386**	0.186
Recruitment of temporary/casual labour	0.600	-0.333	-0.264
Recruitment of unskilled permanent labour	0.660	-0.356	-0.232
Recruitment of skilled permanent labour	0.696	-0.186	-0.172
Training of skilled permanent labour	0.706	-0.104	-0.005
Retirement benefits offered to unskilled permanent labour	0.658	0.369	**-0.465**
Retirement benefits offered to skilled permanent labour	0.677	0.288	**-0.419**
Medical care offered to unskilled permanent labour	0.576	0.315	**0.529**
Medical care offered to skilled permanent labour	0.601	0.315	**0.559**
Death and disability benefits offered to unskilled permanent labour	0.646	**0.568**	-0.143
Death and disability benefits offered to skilled permanent labour	0.686	**0.535**	-0.117