# The Impact of AIDS on Small Scale Farmer's Production in Borno State

A research project submitted to Van Hall Larenstein University of Applied Science in partial fulfilment of the requirement for the award of master's degree in management of development (MOD) with specialization in rural development and HIV/AIDS

**By**

**Bunu Umara Goso**

September 2011

Wageningen

The Netherlands

**Permission to use**

In presenting this research project in partial fulfilment of the requirement for the award of master's degree, I agree that the Library of this university (Van Hall Larenstein University of applied science) may take it freely available for inspection. I further agree that permission for copying of this research project in any manner, in whole or part for scholarly purpose may be granted by Larenstein director of research. The full text must not be sold in any format or medium without the formal permission of the copy right holder.

**Dedication**

This Thesis work is dedicated to the memory of my late brothers and sisters: Mallam Mutti, Falta Alaye, Mal. Bunu Gana, Umar Gana Bulama, Aliram Gana, Ya Lawal and Fanna Gaji

**Acknowledgement**

I am indebted to the Almighty Allah for making me what I am today and sparing my life. I am also equally grateful to my parents, wife, friends and in-laws for taking pain to look after my Children while away in the Netherlands. I must thank sincerely to NUFFIC, people and government of Netherlands, Borno state government for funding the study that contributed greatly to the success of the programme.

I acknowledge with gratitude to my supervisor Koos Kingma; who is the Director of management of development(MOD) and coordinator Masters rural development and HIV/AIDS Van Hall Larenstein, University of applied science, The Netherlands. I have been inspired by her motherly encouragement, giving of expert technical advice as well as showing keen interest toward the success of this research. I have no right words to express my gratitude to her, despite of her tight schedules; she was able to give me deserved attention.

I equally acknowledge contribution of my friends and colleagues both from rural development & HIV/AIDS and other specializations for their inputs and technical support while working on the thesis. I acknowledge with thanks the fraternal understanding of my friends particularly Alhaji Modu kulloma and Engineer Ibrahim Alkali for their moral and financial support, without their help this programme will not be feasible. Their assistance has greatly helped me from the beginning of this programme until maturation of the master's programme. Others highly deserved my appreciation for their assistance towards maturation of this programme in a big way are Alhaji Abbar Umar Gubio, Dr Ibrahim Umara, Dr Baba Gana Umara .

My special appreciation also goes to All the Academic and non-academic staff of Van Hall Larenstein, university of applied science, Staff of Borno state Agricultural development programme(BOSADP), Borno state agency for AIDS control and malaria and other people too numerous to mention for their encouragement and support motivated my academic pursuit to this level.

I am also grateful to Maáji Baba kura for taking the pain to take the minutes of the research interview during data collection. Other had contributed immensely toward the success of this research are Baba Gana Aishami, Mrs fatime suleman, Mohammed Ibn Hussaini, Foki Ali modu, Mrs Karu Alh Bura, Chairman Jere farmers' association, ward heads, in identifying chronically ill households.

Finally my gratitude further goes my children, members of my family, friends, well-wishers who are too numerous to mention individually but include the followings: Baba Gana Tiuye,Alh waziri, Barrister Kaka Shehu, modu Lawan asheik, Y.B Abuna, Hajja Gana, Baba Gana Abba,Baba Gana mohammed, Baa Ku, Alh Bako, Alh Tanko , and Ali pilot.

# Table of Contents

**List of Tables**

**List of figures**

**List of acronyms (abbreviations)**

*ADPs……Agricultural development programmes*

*ARTS……..….Antiretroviral*

*BADPEC……..Borno state agricultural development programme*

*Executive committee*

*BOSADP……Borno state agricultural development programme*

*BOSG……Borno state Government*

*BOSACA……...Borno state agency for the control of AIDS*

*CDC……Centre for disease control*

*CGIAR……Consultative Group on international agricultural research*

*DR……...Doctor*

*FAO……..Food and agricultural organisation*

*FGD……Focus group discussion*

*FMOH……Federal ministry of health*

*GPC……Governing programme council*

*HEAP……Health emergency plan*

*HIV/AIDS……...Human immunodeficiency virus/acquired deficiency syndrome*

*HOA……Head of agriculture*

*ICRISAT……international crops research institute for semi-Arid tropics*

*IFAD……International fund for agricultural development*

*IITA……..International institute of tropical agriculture*

*LGA……Local government area*

*MOD……..Management of development*

*MDG……Millennium development goal*

*MHH……Male headed household*

*NACA……..….National action committee on AIDS*

*NGO……...Non-governmental organisation*

*NH……Nursing home*

*NPFS……..National programme on food security*

*PHC……..Primary health care*

*PMU……Programme management unit*

*SBADP……Southern Borno agricultural development*

*STI……..Sexually transmitted infection*

*SSH……State specialist hospital*

*UN……..United nation*

*Nuffic……..Netherlands university foundation for international cooperation*

*UNAIDS……..Joint United nations programme on HIV/AIDS*

*UMTH……University of Maiduguri teaching hospital*

*UNDESA……United nations department of economic & social affairs*

*US……...United state*

*USAID……..United states agency for international development*

**Abstract**

This research aims at identifying the impact of HIV/AIDS on small scale farmers' yields in Borno state. Nigeria has a generalised HIV/AIDS and one of the fastest growing nations with high rates of HIV/AIDS in West Africa. This had an enormous implication on rural livelihood as majority of its people are farmers and live in the rural area. HIV/AIDS has multiple impacts on agriculture, as it erode crop yield, ravaging rural livelihood and exacerbates poverty.

The objective of this study is to contribute to the improvement of crop production by exploring the impact of HIV/AIDS on the livelihood of small scale farmers. To achieve this study was conducted using exploratory and descriptive design. Data was collected through a case study using proxy indicator of chronically ill households. Farmers interview, key informants interview, focus group discussion, observation were used as a tools to collect data for the research.

The finding of the study shows that there is high level of morbidity and mortality in the study area. Majority of the ill people and the death cases are among the age group 18 – 29 which are the most productive members of the society. This has affected land in cultivation and crop produced there by exacerbating hardship and poverty to the people. The findings also show land in cultivation is reduced, women were confining to household and are not involve in decision making process due to religious injunction. The study further identified differential vulnerability in households, crop cultivation between infected person farm land and non-affected farm lands. The findings also show that local government council are not supporting the infected peoples in the study area.

Based on the conclusion of the study, the study recommended for an immediate intervention by the Borno state agricultural development programme to provide specials farming packages, promote less labour intensive implement for all HIV/AIDS infected and affected people, urgent provision of financial and materials support to all AIDS affected people as well as assist them in building their houses to cope with the dying situation. The studies further called on government to provide the community with subsidized farming inputs, awareness campaign on HIV/AIDS to reduce stigma and discrimination against infected people, improvement of the status of women in the society and finally government should appoint a professional agriculturalist to pilot the affairs of the Borno state agricultural development programme.

## Chapter 1: General Introduction

### 1.0 Introduction

This chapter gives a summary of the AIDS epidemic in Borno, Nigeria and what government is doing to tackle its impacts. Further, it attempts to describe the impact of HIV/AIDS to the agricultural sector in Borno state, the response of government and its institution. Finally the chapter describe the background of the study with respect to geography, population, climate of Borno state, impact of AIDS to agriculture, Borno state ADP, research problem, main research questions and rationale behind the study.

### 1.1 Borno state: Background

Nigeria had a population of 140,003,542 million people; it has a generalised HIV/AIDS prevalence rate of 5.8%. It is one of the countries with fastest growing rates of HIV/AIDS cases that had enormous impact on rural livelihood in West Africa. The HIV/AIDS epidemic in Nigeria is fuelled by a number of factors which include low status of women, low literacy level; high rates of sexually transmitted infection (STI) in vulnerable groups and general lack of information on perceived risks( UNAIDS,2011).

The state Agricultural sector is faced by series of natural and man-made calamities. This include drought, dessert encroachment, Crop pest and insect infestation, which resulted in to poor crop yield thus brought about chronic food shortages and great deal of suffering to many families (Willem, 2008). Furthermore Study conducted by the federal government on national HIV Sero–prevalence sentinel survey 2010 shows that HIV/AIDS has further crippled the fragile agricultural sector as the study indicated that Borno state has the second highest HIV/AIDS prevalence rate in the north eastern part of the country. Furthermore according to FMOH, (2010) since 1984, when AIDS was officially reported in the country, HIV/AIDS is a growing public health problem in the state, this is because HIV Pandemic has resulted in reduction of available resource and loss of agricultural labour and reduction of working time leading to loss of productivity and production pattern in the state.

**1.1.0 Geography:** Borno state is located at latitude 10.4° – 13.6° N and longitude 2.4° - 14.46° E and can be traced in the North Eastern par t of Nigeria. The state has an area of 61,435sq. Km and is the largest state in the federation in terms of land mass. The state occupies the greatest part of Chad basin and shares borders with the Republic of Niger to the north, Chad to the North – East and Cameron to the east. Within the country, its neighbour is Adamawa to the south, Yobe to the west and Gombe to the southwest, (BOSG, 2008).

Figure 1: Map of Nigeria showing Borno state


**Source: World fact book**

### 1.1.1 Population:

According to the 2006 provisional census, there are 4, 151,192 people, out of this population 2,161,157 are male and 1,990,036 were female. There are 60 inhabitants per square kilometre (Bureau of statistic, 2006).

### 1.1.2 Climate

The period of wet season varies from places to places due to number of climatic factors ranging from rain bearing, winds and topography. Generally the rain season is normally from June to September in the northern part of the state while May to October in the southern part of the state with relative humidity of about 49% and evaporation of 203 per year. The state has two major vegetation zones viz; Sahel in the northern part with severe desert encroachment covering most of the chad basin areas and Sudan savannah in the southern part which consists of scrubby vegetation interspersed with all tree woodlands (BOSG, 2008)

### 1.1.3 Agriculture

Borno is an Agricultural state; it has vast fertile land for Agricultural production of crops; sorghum, millet, cowpea, maize, rice groundnut and guinea corn. Irrigation farming activities is being practiced along the Lake Chad shore, Alau Dam, Jabarmari and Biu areas. Eighty five per cent (85%) of the people of the state are farmers, and engage in food and cash crops, livestock rearing thus make the state as Agricultural and livestock centre in the whole of West Africa. Its major cash crops include: groundnut, cotton, cowpea, sorghum, wheat, sweat potatoes, maize and sugar cane (Third national fadama Project, 2011)

The livelihood strategies for most men and women in the state are based on Agriculture, (IITA, 2006). Farming is characterised by a variety of crops and livestock based production system. Crops are mainly grown for subsistence; In the southern part of the state, maize, sorghum, cowpea rice and soybeans are major cash crops while in the central and northern part of the state are sorghum, millet, beans, groundnut and watermelon. Livestock – small and large ruminants as well as poultry are integral part of the farming system which provides income as well as safety net.

According to (Abdullahi et al, 2006) rainfall variability and drought are the key issue in agricultural production in the arid and semi-arid region. Drought is a period of inadequate rainfall either in time or in space, which results in crop failure, sufficient to cause a severe shortage of food in a rural population. In many of the sub-Saharan countries including Nigeria, drought and its consequences are historical as well as contemporary problems.

The arid and semi-arid zones of Nigeria are generally considered as drought prone. During the drought of the 1972 – 73 in the north-eastern Nigeria for instance, about 300,000 animals representing 13% of the livestock population of the region were reported dead, while agricultural yield dropped to between 12% and 40% of the annual averages (Fagbemi, 2002). The effect of drought in terms of reduced food production has been even more severe during 1982-84 than 1972-74. In some parts of Borno state (then comprising of Borno and Yobe states) nearly 100% crop losses were recorded. Millet is one of the most important crops both in production and consumption in northern Nigeria, where it is mainly produced (Agboola, 1979, CBN, 2001, Abdullahi et al; 2006). Its production is undermined and yield is always made un-certain due to occurrence of drought. While natural disasters (e.g. drought and desertification) have degraded most of the vegetation covers. The main livelihood of the people is agriculture of which millet is the most important crop both in production and consumption (BOSADP, 2000, YOSADP, 2001 ;).

### 1.2.1 Agriculture and HIV/AIDS

Agriculture is the mainstay of rural economies in many of the developing nations. The significant proportion of the population relies on farming as their main source of livelihood, not only for feeding their own families but also for generating small surplus of income in order to meet their household cash requirement (FAO, 2011).

The greatest of majority of people in most countries affected by the HIV/AIDS live in rural areas, UNDESA (2011). The majority of rural agricultural households rely predominantly on human labour to perform agricultural task and HIV/AIDS tend to affect the most productive age group. Its characterised by repeated period of illness, which will reduce labour available for agricultural and domestic tasks and increase medical expenditure. When the affected member dies, the rural household has to meet funeral expenditure and the loss of knowledge, skill and possibly property, FAO, (2003). HIV/AIDS has multiple impacts on agriculture and livelihood of rural households which are slowly understood by many agencies and organisations. HIV/AIDS if left unchecked, it gradually erodes food security, ravaging rural livelihood and exacerbating poverty and also under mind all effort aim at achieving millennium development goals.

HIV/AIDS takes heavy toll on the poor; affected rural families commonly shift to off – farm income to eating activities such as small scale trading, processing and servicing, which requires access to urban or pre-urban communities. People may migrate in search of employment or may look for rapid income; which can lead to high – risk behaviours such as drug abuse or involvement in prostitution. The consequences of poverty increase infection and the disease in turn exacerbate poverty.

### 1.3.1 HIV/AIDS in Nigeria and Borno state

The first two cases of HIV/AIDS in Nigeria were discovered in 1985 and were reported at an international AIDS conference in 1986. At the onset discovery of the epidemic, government response was very slow due to military regime. In 1999, when elected civilian regime came in

to power, the then president Olusegun Obasanjo prioritised HIV/AIDS as his government working area; thus HIV prevention, treatment and care become one of government's primary concerned.

The presidential committee on AIDS and national action committee on AIDS (NACA) were created in 2001, government set up a three year HIV/AIDS emergency plan (HEAP), (Avert, 2011). Despite the intervention by the democratic regime HIV/AIDS as its working priority area, the prevalence rate continue to increased rapidly from 1.8 % in 1991 to 5.1 % in 2005, (USAID, 2011), (Peterson .K. and Obileye O, 2002),

The state HIV/AIDS prevalence rate stood at 5.6 %, second highest state with the HIV from Northeast part of the country, FMOH, (2010). Since 1985, when AIDS was officially reported in the country, HIV/AIDS become a growing public health problem in the state, FMOH, (2010). This is because HIV/AIDS has further compounded the fragile agricultural sector which for long been affected by desert encroachment and drought. HIV/AIDS decrease labour on farm and working time, leading to loss of productivity and production pattern. HIV/AIDS epidemic in the state is further fuelled by low status of women, low literacy level, high rates of sexually transmitted infection (STI) in vulnerable groups and general lack of perceived risk (pathfinder international, 2011).

### 1.4.1 Impact of AIDS on Agriculture in Borno state

The majority of people in Borno state are farmer's and live in the rural areas. The HIV/AIDS prevalence rate in rural area was high among female ages 15 – 24 that constitute 80% of the agricultural work force (FMOH, 2010, Sheriff, 2005). This rapid increase in HIV/AIDS has affected the farming sector in many ways which includes absenteeism cause by AIDS related illness and loss of labour from AIDS related death. This had led to reduction of area of land under cultivation thus decline in crop production and reduction in food produced. The loss of labour had also led to decline in crop production and change in labour intensive to less intensive system. The livestock productions and weeding and pruning of farm are all has been curtailed.

### 1.5.1 Borno state Agricultural development programme (BOSADP)

The Borno State Agricultural Development Programme was established in 1982 by an edict of the Borno State House of Assembly. It has staff strength of 867 strong workers and out of the number 432 are extension agents (both male and female) divided along the three operational zone of the ADP. Prior to 1988, the ADP existed under two separate locations, commonly identified as Borno State Accelerated Development Programme (BOADAP) and Southern Borno Agricultural Development Project (SBADP). The two programmes were merged in 1988 under one governing law, to become Borno State Agricultural Development Programme (BOSADP).

The Vision is to contribute toward agricultural production and wellbeing of small scale rural farmers in Borno state and the mission is to provide and sustaining modern techniques of farming to improve agriculture production in the rural communities.

### 1.5.2 Structure and services of the ADP to farmers

The Borno state Agricultural Development Programme Executive Committee (BADPEC) is the highest decision making body under the chairmanship of the state Governor and with all the partners as members (federal ministries, state tertiary institution, Lake Chad research and university, state ministries). This body meets every three month to take decision and action on all programme activities and the next in line is the General Purpose Committee (GPC) under the chairmanship of the commissioner of Agriculture.

The programme management Unit (PMU) comprises of all the head of departments, Zonal managers, three sub partners (IFAD, NPFS, and FADAMA III), Programme secretary and the programme manager.
The ADP has six functional directorates that oversee its activities. These directorates are finance & accounts; planning, monitoring and evaluation, agric. and technical services, rural institution development, administration and supplies, and engineering and infrastructural services.
The Borno state agriculture programme through these departments provides special services like extension services, special programme for food security (SPFS), rural institution development services for community mobilizations, sensitization; participatory issues for better livelihood across state. Others services that provide by the organisation to the rural people include construction and maintenance of rural feeder roads; earth ponds; cement well, wash boreholes and tube wells used for both irrigation and domestic's purposes. The ADP also operate through a collaborative partnership with three vital sub-programmes that had a lot at stake in complementing government's efforts in fighting poverty through job creation, enhancing food security status of the underprivileged members of the community by providing social services – all with a view to up-lifting the status of life of the rural poor in line with its mandate.

### 1.5.3 Current responses by BOSADP to HIV/AIDS

The office of head of the federation directed all agricultural development Programme (ADP's) in the country to establish HIV/AIDS desk in their respective organisation following rapid increase in HIV/AIDS related diseases in the country. The Borno state agricultural development programme immediately established the HIV Desk office to be overseen by the director administration; however there are no qualified and train staffs to carry out HIV policies in the organisation Despite the directives. Secondly there is no HIV/AIDS work policy in the organisation to tackle the spreading of HIV/AIDS.

There is National HIV/AIDS policies that provide for "HIV/AIDS action plan in the country. These include the 1997 adoption of National policy on HIV in the country that make mandatory to control the spreading of the epidemic in line with the Millennium development goal (MDG), (Journalists against aids Nigeria 2010).

The administration department was also further instructed by the management (BOSADP) to work out a blue print on how the unit will operate effectively in the organisation. The management is further instructed the desk officer to search for other partners that will assist the organisation in mainstreaming HIV/AIDS policy in the programme.

However from the time of the establishing the HIV/AIDs desk office to date there is no any substantial progress has been achieved in mainstreaming HIV/AIDS policies in the organisation because there are no trained staffs, no office accommodation as well as no funding made available.

### 1.6.1 Problem statement

Study conducted by Willem (2008) suggests that agricultural sector in Borno state is faced by several threats. These include drought, desert encroachment, insect infestation of crops and crop failure. It further goes on to state that there is a problem due to biophysical condition of the state such as erratic rainfall, marginal soil fertility, among others, which pose a serious threat to the agricultural sector in the state. Some of the noticeable consequences

of desert encroachment in the state are accentuation of poverty among inhabitant along the desert fringes due to invasion of village and farmland by sand dunes.

Study conducted by the federal government on national HIV Sero–prevalence sentinel survey 2010 indicated that Borno state has the second highest HIV/AIDS prevalence rate of 5.6% in the north eastern part of the country. The study shows that the HIV/AID prevalence rate was increased from 4.4% in 1991 to 5.6% in 2010 (FMOH, 2010). Furthermore according to study conducted by Sheriff (2005) that HIV/AIDS is more prevalent among adolescents and young adult girls who incidentally, provide more than eighty per cent (80%) of agricultural workforce of the state. In line with the enormous problem stated above, the Borno state agricultural development programme want to find out the severity of the impact of HIV/AIDS on small scale farmers crop production for the proper interventions programmes based on the situation.

### 1.7.1 Objective of the study

To contribute to the improvement of crop production by exploring the impacts of HIV/AIDS on the livelihood of small-scale farmers in Borno state

### 1.8.1 Main research question

What are the impacts of HIV/AIDS on crop production among the small scale farmers in Borno state?

### 1.9.1 Sub research question

i) What is the situation of farm yields of small scale farmers before being infected by HIV/AIDS in Borno state?

iii) How do AIDS affected households from small scale farmers cope with the impacts of HIV/AIDS in relations to farm yields in Borno state?

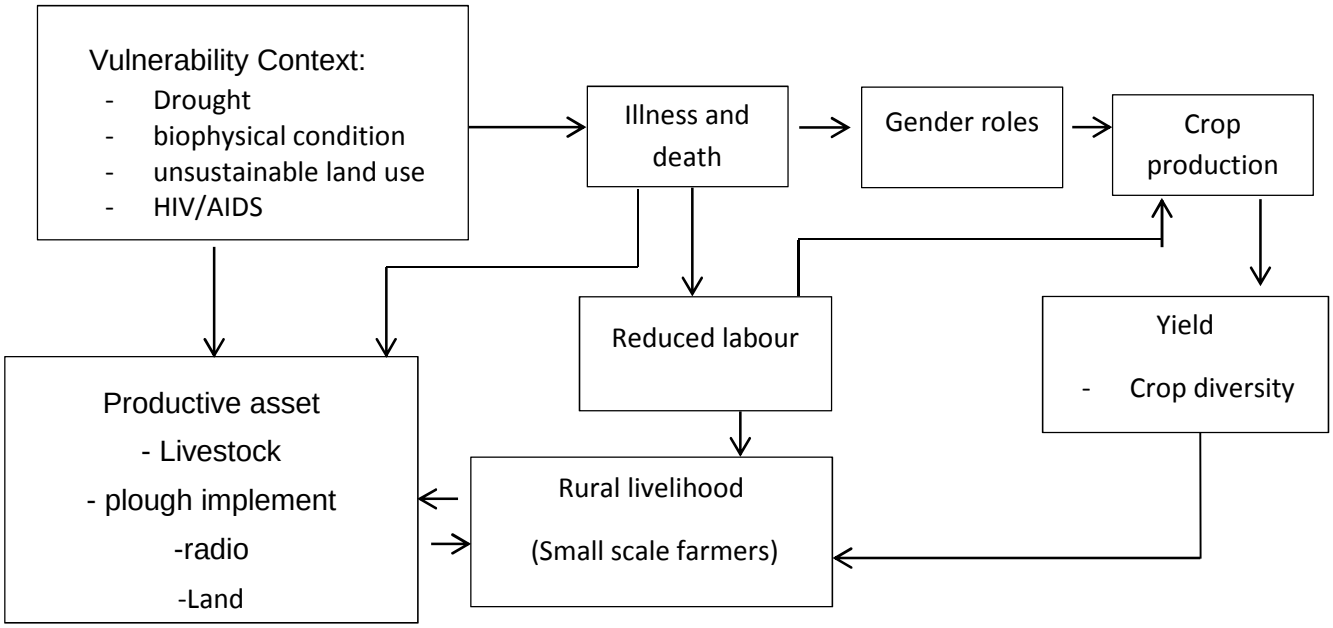
### 1.10.1 Conceptual frame work

A set of coherent ideas or concepts organised in a manner that makes them easy to communicate to others.

### 1.10.2 Introduction

AIDS is stand for acquired immune deficiency syndrome. It is the name of the fatal clinical condition that results from infection with the human immunodeficiency virus (HIV), which progressively damages the body's ability to protect itself. The disease is caused by virus known as the human immunodeficiency virus or HIV. The virus can remain in person's body for many years and gradually develop in to AIDS (online medical information, 2011).

AIDS may become a serious menace to crop production in the rural households because it causes death and reduce labour availability for amongst others crop production in households through affecting productive members of the household. Due to morbidity and mortality household labour is reduced in relocation time to care for the sick person. This affect cultivation during farming season (rainy period) when the demand of labour is highly required for land preparation, sowing and weeding as labour demand for farm work may remain unmet due to domestic task in nursing of AIDS infected person. The impact of relocation of labour to domestic work has led to reduction of land for cultivation. The household crop production will be reduced and in event of death female is force to change cropping pattern focusing on less labour intensive crops.




The conceptual framework above shows the small scale farmers were exposed to number of vulnerability context that have impact on their livelihood. HIV/AIDS has multiple impacts to small scale farmers through illness and death which will reduce the labour for the cultivation of crop. This will affect yield of crop production of different varieties for both men and women. Men crops are those economic crop as well as that demand high labour for cultivation such as sorghum, millet while for females crops are those that that are not economic crops and required less labour compared to men for men crops. Example rice, millet cultivate by men and Okras by women.

**1.11.3 Definition of concepts**

Biophysical - explain land use system in physical terms such as crop yield, environmental effects, and effect on management (www.itc.nl/rossiter/doc/EOLSS_1527_preprint PDF)

Drought – A climate excursion involving a shortage of precipitation sufficient to adversely affect crop production or range production (www.md.water.usgs.gov/drought/define.html)

Gender – Is a socially constructed definition of women and men. It is not the same as sex (biological characteristic of women and men) and it is not the same as women. Gender is determine by the conception of task, function and roles attributed to women and men in society and in public and private life (www.gender.cawater-info.net/what_is/index_e.htm)

Yield – A measurement of the amount of a crop that was harvested per unit of land area. Crop yield is the measurement often used for a cereals, grains or legumes. (www.investopedia.com/term crop-yield.asp)

Crop diversity – provide with additional alternative crops and cropping system to provide improved nutrition as well as higher incomes and crop yields. (www.icarda.org/crops.htm)

Crop – harvest or yield of grains, fruits, nuts, vegetable, and tobacco, and cotton, food for cattle or flowers. (library.thinkquest.org/TQ0312380/crop.htm)

Unsustainable land use (farming practice) - Poor farming practice which can degrade and erode the soil to a point where nothing can be grown on the land. (www.iwmi.cgiar.org/publication/water-policy-briefs/pdf/

Vulnerability – diminished capacity of an individual or groups to anticipate, cope with, resist and recover from impact of natural or man-made hazards. It can arise when people are isolated, insecure and defenceless in face of risk, shock or stress. (www.ifrc.org/en/what - we- do/disaster-management/what-is-vulnerability)

Small scale farmer – Farmers living in rural areas with farm holdings of 1-2 hectares usually scattered over a wide area (www.lautechaee- of edu.com/journal/ijaerd3%20-%206.pdf)

Crop production – planting and cultivation desired crops plant for food production (www.nou.edu.ng/noun/noun/noun_OCL/pdf/pdf2/AGR/).

Crop yield - is the amount of plant crop (such as cereal, grain or legume) harvested per unit for a given time.

## Chapter 2: Literature review

### 2.1 Introduction

This chapter had deals exclusively with key topic identify under the conceptual framework of the study. These include HIV/AIDS, impact of HIV/AIDS on crop production, Gender division of labour, farm yield and small scale farmer's farms and constrains.

### 2.2 HIV/AIDS

HIV is the human immunodeficiency virus. It is the virus that can lead to acquired immune deficiency syndrome or AIDS. The origins of AIDS is not known, what is known is how and when it manifested. AIDS was first recognised in the United States in 1981 in homosexual men. Today is seen both homosexual and heterosexual men and women. AIDS are the advance form of infection with HIV virus. This virus may not cause recognizable symptom for a long period after initial exposure (Latent period), (free dictionary, 2011).

According to centre for disease control and prevention (CDC, 2011) there are two types of HIV/AIDS; HIV-1, HIV-2. Both types of HIV damages a person's body by destroying specific blood cells, called CD4 +T cell, which are crucial to helping the body fight disease. Within a few weeks of being infected HIV, some people develop flu-like symptoms that last for a week or two, but other have no symptoms at all. Early symptoms of HIV/AIDS can include fatigue, headache, recurring fever, swollen glands, weight loss, yeast infection.

### 2.2 1 Characteristic of HIV/AIDS

(1) HIV/AIDS is a cluster disease unlike other diseases, it affect both husband and wife. When the husband dies, after a while the wife too will die.
(2) The infected persons show symptoms after 2-15 years after the initial infection. The time interval between development of AIDS symptom may range from 10 -15 years (infected to full blown AIDS development)
(3) AIDS will look lethargic, and weak, vulnerable to all kinds of diseases.
(4) The virus is spread through high risk behaviour including unprotected oral, vaginal or and sexual intercourse, sharing needles.
(5) If a woman with the virus is pregnant, her new-born baby can catch the virus from her before birth, during birthing process, or from breastfeeding.
(6) When the CD4-T cell counts is less than 200 (Normal: 500 to 1500), then the patient is considered to have AIDS.
(7) When AIDS in its advanced stage vulnerable once could develop complications of disease such as diarrhoea, respiratory infections, skin blisters, body weight continued to decline, and become thin and dry.
(8) AIDS is the late stage of HIV infection, when person's immune system is severely damaged and has difficulty, fighting disease and certain cancers. Before the development of certain medication, people with HIV could progress to AIDS in just few years (WHO, 2009)

Therefore, it is important to control symptoms, support the immune system and lower the levels of HIV circulation in the blood. To lower the level of HIV in the blood, patience take prescribed combination of antiviral drugs and quality diet. Adequate hydration (fluid intake) and increase calorie and protein intake are necessary to fight the infection. Proper nutrition must begin immediately to support nutritional deficiencies. These nutritional deficiencies

contribute to decreased immunity and disease progression. The diet that should be given include meat, fish, beans, seeds and nuts, whole grain breads, cereals, fruits and vegetable.

### 2.3.1 Impact of HIV/AIDS on crop production

HIV/AIDS has several impacts on crop production in the following ways:

### 2.3.2 Labour

According to food and agricultural organisation (FAO, 2001), it is estimated that in the 25 most affected African countries; HIV/AIDS has killed seven million agricultural workers between 1985 and 2001. Many households appear to be experiencing reductions in labour quality and quantity as a direct result of HIV/AIDS pandemic. Productivity initially reduced when the HIV/AIDS infected person is ill, and later the supply of household labour declines even further with the death of that person. More labour intensive farming systems with low level of mechanisation and agricultural inputs use are particularly vulnerable to the impact of HIV/AIDS as the economic return to labour tends to be low. Other impacts includes household member devote productive time to caring for the sick persons and traditional mourning custom which can last as long as 40 days for some family members leading to adverse effect on availability of labour. Beside the loss of labour, there is loss of agricultural knowledge and skills as adult die before passing their knowledge to their children. There is also the problem of loss of access to land by widows after death of their husband. Mutangadura et al(1999) summarised the impact of HIV/AIDs pandemic on agricultural production in rural area as follows: “The major impact of HIV/AIDS on small scale holders agriculture include serious depletion of human resources, diversion of capital from agriculture, loss of farm and non-farm income and other psychological impacts that affect agricultural productivity. Women and men, young and old, people expected to plough the land, tend the crop harvest and store the produce are dying”, (Ajieh and Okoh, 2009).

### 2.3.3 Income

HIV/AIDS usually begins to affect a households income during the illness of an HIV/AIDS infected and affected household member. If the infected or affected person’s income depends on his or her productivity (as it often does, for example agricultural small scale farmer), the income loss set during illness thus affect crop cultivation. Households affected by HIV/AIDS faces two types of cost: First the increased cost of medical treatment for HIV positive members who are beginning to develop symptoms of AIDS – related diseases and are experiencing more frequent illness. The total expenditure of the household will depend on its income and circumstances. Wealthy households may opt for very expensive private treatment, using the result of latest medical research, which keep infected people asymptomatic for extended period. The poorest households will be forced to rely on public medical provision but will still face additional costs for transport and food. The second additional coast is the cost of a funeral when the ill household member dies. Funeral can be very expensive, often requiring a large number of people to be fed for many days, in addition to the cost of casket and ceremony. The total expenditure will again upon affect the household incomes. Therefore the illness and death of household member affect the income of the entire household. This would affect crop production as household incomes were all invested in purchasing drugs for the for the AIDS affected person.

### 2.3.4 Money

According to (Bollinger et al, 1999) the economic impact of AIDS will be felt by individual and their families, and then ripple outwards to firms and business and the micro-economy. The HIV/AIDS impact begins as soon as members of the household start to suffer from HIV- related illness:

- Loss of income of the patient (who is frequently main bread winner)
- Household expenditure for medical expenses may increase substantially
- Others members of the household, usually daughters and wives, may miss school or work less in order to care for the sick person

When the husband die from AIDS, their widows suffer from lack of cash, since men are the main cash income earners. The most pressing needs for widows was for credit to begin crop cultivation or new cash generating activities that could supplement farm work.

### 2.4.1 Impact of HIV/AIDS on productive assets

Research has shown that HIV/AIDS first affects the welfare of the households through illness and death of family members which in turn leads to the diversion of resources from saving and investment in to care (FAO, 2011). According to lovelife (2000), once a household member develops AIDS, increase medical and other costs, such as transport to and from health services, occur simultaneously with reduce capacity to work, creating a double economic burden.

Studies shown that households with an AIDS sufferer frequently seek to keep up with medical costs by selling livestock and other assets including land( FAO, 2011). Furthermore according to Gobotswang (2006) when HIV/AIDS strike a household, they often trigger a chain of even that include disposing of livestock that is critical for drought power and combined with the loss of an adult, this could have an impact of crop production. On average the non-affected household produce 41 bags of crop while the affected households produced 30 bags during illness. The number of bags drops to eight after illness and subsequent death.

According to curry, et al., (2006) when HIV/AIDS strike a household, there is significant impact of HIV/AIDS effect in the affected households than non-affected households due to HIV/AIDS illness and death which resulted in labour loss, income, high medical expenditure and less food for the household. Study also further show that because of the death of an adult in the household it had a mixed set of effects on Household assets; the most immediate impact on household assets is the shortage of labour experienced by households in which one or more members suffer from HIV/AIDS. This means the house hold does not only lose the productive labour but it also loses significant labour of the other household members whose time is absorbed in caring for sick and dying members. There are also immediate costs in term of the funeral and potentially the loss of assets for widow and orphans where inheritance practices leave them without entitlement (O'Donnell, M, 2004).

### 2.5.1 Differential vulnerability to impact of AIDS

It is important to recognise that the impact of HIV/AIDS on rural households is not equal: the poorer ones, especially those with small land holdings are much less able to cope with the effect of HIV/AIDS than wealthier households who can hire casual labour and are better to absorb shocks (FAO, 2011). Guerney (2001) has raised the question as to who benefit from the sales of assets by farm-households attempting to cope with long drawn out effects of HIV/AIDS. In his view, the number of occurrences evident could lead to significant changes in the socio-economic structures of villages, redistribution of wealth and land. HIV/AIDS

infection ultimately stretches the resources of an extended family beyond its limits as both material and non-material resources are rapidly consumed in caring for the infected.

According to McPherson (2005) that "HIV/AIDS diminishes the capacity of farm families to produce income, generate welfare, and respond to stress. HIV/AIDS undermines both the quantity and of quality farm assets. Human capital is lost through death and disability and it's also affects the ability of family to sustain (or expand) its operations by diverting financial resources from investment to (health related) consumption. Distress sales of physical assets erode the family's resources". Furthermore the food and agricultural organisation (FAO, 2011) state that it is increasingly clear that as a result of HIV/AIDS causing significant increase in morbidity and mortality in prime-age adults, increasing negative social, economic and developmental impact will occur. As clearly indicated the economic impact at household level will decrease productivity capacity and changing the expenditure patterns.

### 2.6.1 Coping strategies

In the face of extreme impacts of HIV/AIDS, Balyamujura et al (2000) identified three categories strategies to cope with the epidemic. These three strategies have been elaborated in table 2 below. UNAIDS (1999) suggest that individual and households undergo processes of experimentation and adaptation, when adult illness and death impacts whilst an attempt is made to cope with immediate and long-term demographic changes. several factors will determine a household ability to cope including access to resources, household size and composition, access to resources of the extended family and ability of the community to provide support (UNAIDS, 1999) the interaction of those factors will determine the severity of the impact of HIV/AIDS on the household.

**Table 1 Household coping strategies**

| Strategies aimed at improving food security | Strategies aimed at raising and supplementing income to maintain household expenditure pattern | Strategies aimed at alleviating the loss of labour |
|---|---|---|
| - Substitute cheaper commodities e.g. porridge instead of bread<br>- Reduce consumption of item<br>- Send children away to live with relatives<br>- Replace food item with indigenous / wild vegetable | - Income diversification<br>- Migrate in search of new jobs<br>- Loans<br>- Sale of assets<br>- Use of savings &investment<br>- Beg | - Intra-household labour reallocation & withdrawing of children from school<br>- put in extra hours<br>- Hire labour & draught power<br>- Decrease cultivated area<br>- Relative come to help<br>- Diversify source of income |

Thus major survival strategies developed in response to the epidemic may include the altering household composition, the withdrawal of savings and sales of assets, the receipt of assistance from other households. Following death, the impacts break out households and in to community in form of increase number of dependant such as orphans and widowers.

### 2.7.1 Gender

Gender refers to the social attributes and opportunities associated with male, female and the relationships between women, men, girls and boys as well as the relations between women and those men. These attributes, opportunities and relationships are socially constructed and are learned through socialization process. They are context/time specific and

changeable. Gender determines what is expected, allowed and valued in women or a man in a given context. In most societies there are differences and inequalities between women and men in responsibilities assigned, activities under taken, access to and control over resources, as well as decision making opportunities. Gender is part of broader socio – cultural context. Other important for socio-cultural analysis includes class, race, poverty level, ethnic group and age (UN, 2000). Gender further means socially and culturally determined characteristic associated with women and men; the assumptions made about the skills and abilities of women and men based on these characteristics. The conditions in which women, men live and work. The relations that exist between women and men, and how these are represented, communicated, transmitted and maintained. This includes sexual and social relations based on sexuality, relations of power and control based on gender.

### 2.7.2 Gender and Agriculture

Agriculture is the central to the livelihoods of rural poor's and in the attainment of the millennium development goals (MDGs). Agriculture can be the engine of growth and is necessary for reducing poverty and food insecurity, particularly in sub-Saharan Africa (IFAD 2001; World Bank 2007). Understanding the dynamics processes of change is crucial to better position the sector for faster growth and sustainable development, which is vital for food and livelihoods security for millions of men and women worldwide.

Three out of every four people in developing countries live in rural areas, and most of them depend directly on agriculture for livelihoods (FAO, 2009).The central role of gender in agricultural development in Africa is now widely recognised because women produce 80 per cent of the basic foodstuffs both for consumption and sale in sub-Saharan Africa. In many parts of the world, women are the main farmers or producers, but their roles remain largely unrecognised (FAO, 2006 cited in Nguthi, 2007). According to the 2008 world development report: agriculture for development highlights the vital role of agriculture in sustainable development and its importance in achieving the millennium development goals of halving by 2015 the share of people suffering from extreme poverty and hunger.

### 2.7.3 Gender Division of Labour and Impact of AIDS

The sexual division of labour is a phenomenon found in virtually all human societies across the world. Due to the importance, economist has attempted to model the causes and implication of gender roles across societies. Gender exclusion in labour market is high, fuelled by gendered and discriminatory practices and assumption. According to Hadfield (1999) that the sexual division of labour is fairly constant across societies, i.e. all task in a society tend to be gendered (easily identifiable as either women's or men's work) but a particular division is not (to which sex, a task is specific, varies considerably across cultures.)

The biological division model does not account for this fact. Furthermore, as time passes, technological developments contribute to the reduction of comparative advantage enjoyed by any gender in performance of a particular activity. For instances, through the ages, technological changes have lessened the brute physical component of labour. As a result, the absence of any significant biological advantage also calls in to question the continued applicability of biological model. Hadfield proposes a model where an individual's incentive to coordinate her human capital investment with those of future but yet undetermined partner of the opposite sex, leads to a correlation between the person's sex and her economic role.

In her model, potential spouses choose first the level of investment in each of the two types of human capital, and subsequently engage in the search for a marriage partner. Until human capital investment are made, all individual of given sex are a prior identical. In her set up, mates are only in terms of household utility obtained with them. Thus, premarital investments determine an individual's desirability on the marriage market. Women were said to produce subsistence crop because they are responsible for feeding the family, while men grew cash crop because they are responsible for providing cash income for the family (Negash and Niehof 2004).

The gender division of labour that assign to women the triple role of reproduction, production and community management lead to heavier workload for women in comparison to men. Gender division of labour tends to intensify the negative impacts of AIDS not because women commonly responsible for large proportion of crop planting, weeding, and harvesting, but they also care for small ruminants and poultry and collect water and fuel wood. In other word they have little unutilised time to compensate for the male morbidity and mortality. So any loss of male workers or protracted illness in the household, it is difficult to absorb at household level without loss of agricultural production and subsequent loss of crop yield.

There are numerous significant linkages between gender and agriculture. With regard to gendered impact of AIDS on livelihood, before falling ill, a woman will often have care for the sick husband, thereby reducing the time she can devote to planting, harvesting and marketing crops. When her husband dies, she is often deprived of credit distribution network or land right. When she dies those household will risk collapsing completely leaving children to feed for themselves (UNSG, 2002). The impact of AIDS on Gender aspect in agriculture affects access to land, and control over resources, with consequences for food security as well as market and policy decision. In many countries women's access to land is limited. Patrilineal inheritance customs regulate land ownership and property rights and there by influence control overland and food sovereignty. At the same time, women make up 51% of the agricultural labour force worldwide, significantly more in global south. Example, 80% of female employees and self-employees in sub-Saharan Africa are working in the agricultural sector.

### 2.8.1 Small scale Farmers

Small scale farmers are those farmers holding small farm less than those at provisional or national level. However, farm size alone is not always a good criterion for categorizing farmers. Farmer who own 1hactre of irrigated land are generally more prosperous than those who own 2 hectare in a drought prone area of low productivity. In most developing countries, the average land holding ranges from 1 – 2 hectare. Thus soil type is a factor determining crop yield. Most developing countries have two characteristic: Farms are generally small, and most countries suffering from degradation of resources and the environment. Sustainable agricultural practices which are suitable for developing countries must take in to consideration the fact that population growth rates are high, resulting in an increase in food demand at a rate of 3 – 5% per year (Dent, 1989). This rapid increase in population has cause farmers to expand in to marginal areas and make more intensive use of marginalised land resulting in degradation of land and water and causing poverty, malnutrition and a lower standard of living.

### 2.9.1 Crop diversity

Agriculture depends on relatively few crops – only about 150 are cultivated on any significant scale worldwide. However each comes in a vast range of different forms. They may vary for example in height, flower colour. They may also vary in less obvious characteristic such as their response to cold, heat or drought or their ability to tolerate specific pest and disease, (Global crop trust, 2011). In fact it is possible to find variation in almost every conceivable trait including cooking and nutritional qualities and taste. If trait cannot be found in the crop, it can often be found in a wild relative of the crop. This multitude of difference trait can be combined in almost infinite number of ways.

Crop diversity can result from different growing conditions: a crop growing in a poor soil is likely to be shorter than crop growing in fertile soil. It can also be the result of generic differences: a crop may have genes conferring early maturity or disease resistance. It is these heritable traits that are of special interest as they are passed on from generation to generation and collectively determines crop overall characteristic and future potential. Through combining genes for different traits in desired combinations, plant breeders are able to develop new crop varieties to meet specific conditions. New varieties might, for example, be higher yielding, more disease resistant and have a longer shelf life than the varieties from which it was bred. For example researchers from IITA and its partner university of Maiduguri, Borno state agricultural development programme, introduced improved crop varieties, trained farmers on improved agronomic practice to improve farmers crop yield aimed at empowering both men and women in the state. IITA (2009) report shows that the aforementioned training programme has improve the nutrition of farmers especially children. Report went on further to state that farmers who adopted the improve technologies and management practices experienced increase food availability and livelihood as well as considerable progress in addressing the problem of declining soil fertility and striga, (IITA, 2009).

### 2.10.1 Determinants and constrains of small scale farmer's crop yield:

### 2.10. 2 Constraints on small scale farmers yield

Basically there are two major constraints to crop yields: The physical environment of the farming and socio – economic environment of the farmers:-

#### A. Physical environment

The Unpredictable rains of short duration cannot be altered but perhaps better use can be made of rain that is available. Example According to publication of ICRISAT headquarter (2011) that India developed the technique of watershed management where runoff water from fields is collected in a tank and later used for supplementary irrigation at the end of season if required, when the rains cut – off early. The difficulty in this concept according to the publication is that there is difficulty initial outlay of capital and cooperation among farmers because it probably beyond the means of most small scale farmers but may be important in future if and when their resources base has been improved. Another possible alternative to this practice is according to ICRISAT develop crop cultivars that are drought tolerant and flower well before the cessation of the rain.

Small scale farmers physical environment (soil fertility) - investment of capital to buy the right fertilizer to be applied at correct time. In this regard, more effort is needed by government of various countries to assist the small scale farmers. The assistance of government becomes

very relevant as the typical small-scale farmer had small land size. Most small scale had land size of 1-3ha for cultivation from which they have to produce food for their family and also grow other crops to generate extra – income to purchase goods that he cannot produce. They therefore use system of mixed cropping that has been developed over centuries as the best farming system to provide his basic need.

**B. Socio economic environment of the farmers**

In recent years, the problem of food production has become more acute because of increase in population and urbanisation. One problem encountered is that farmers grows his crop under low plant population – lower than the carrying capacity of the land in most years and lower than what is possible to achieve maximum returns. To this end, over the years the problem of farming system have been investigated for number of years and recommendation have been made available but most are not accepted by small scale farmers because the farmers in most countries are conservative and requires re-education in newer and better method of farming, Macfarian, ( 2011). More extension and direct contact with the farmers is needed to show them the advantages of new higher yielding genotypes, higher plant populations and new improve farming system. Farmers do not accept new cropping system unless they have assurance that the system will provide higher income.

Study conducted by (FAO, 2011) show a decline in crop yield per area especially in the last five years could be attributed to the followings:

i. A decline in soil fertility
ii. Increase in pest and disease

HIV/AIDS has limited the availability of labour for task like weeding, mulching, pruning, clearing of land among others. These tasks are either inadequately carried out or completely neglected. Decline in yield has result in reduction in household spending power. Cash from the sale of products to buy items like soap and paraffin and hired labour occasional labour or to purchase inputs such as seed and fertilizer as well as agricultural implement may not sufficiently available any more due to AIDS. Thus even further impact crop yield negatively.

**2.10.3 Determinants of Crop yield:**

**1. Decline in soil fertility** – there are signs that HIV/AIDS epidemic is reducing soil fertility. This appears to be due, in part, to the reluctance by farmers to carry out longer term soil conservation measure because such measure do not yield an immediate income and are labour demanding in an environment in which the farming system is already short human resources.

**2. Drought** - The vast majority of poor in dry land depend on agriculture. And drought is the principal constrain of crop production in these areas (CGIAR, 2011). It may be defined as a period in the natural cycle of stress and renewal during which the amount of moisture in the soil no longer meets the need of a particular crop. Drought occurs frequently in a dry land , partly because average rainfall is low, ranging across location and year from an average of about 300 to 800 millimetres per annum, but also because it may be highly erratic, with torrential storm during the cropping season, followed by long dry spells(CGIAR, 2011)

**3. Rainfall** – Africa is a continent under pressure from climate stress and it highly vulnerable to the impact of climate. Many areas in Africa are recognised as having climate that are among the most variable in the world on seasonal and decadal time scale. Floods and

droughts can occur in the same area within months of each other's. These events can lead to famine and wide spread disruption of socio economic wellbeing. (For example, estimated report at workshop indicates that one third of African people already live in drought prone area and 220 million exposed to drought each year. Therefore adequate and sufficient rainfall is a prerequisite for high crop yield in any given area.

**4. Weed** – Ten of thousands of hectares of land have been abandoned due to the difficulty of controlling weeds on certain soils as a result of morbidity and mortality. The impracticability of weed control during period of wet weather on heavy soils restricts the range of crops that can be grown on non-rice crop land. Weeds that are not a problem become so with time or vice versa. Due to AIDS and shortage of labour farm land could not be cultivated thus affection crop production and crop yield.

**5. Inputs** – Appropriate use of farm inputs at right time would increase crop yields and vice versa. Furthermore agricultural farm inputs increase wages, reduces food price and promote economic growth (Crawford et al, 2003). In Malawi, general prices subsided with subsidized credit that were used in the 1970s and 80s in an effort to stimulate production of food crop. After removal of subsidies, Malawi suffered from series of severe and persistent food crises in the preceding years. Therefore farming inputs is another prerequisite for crop yield.

**6. Increase in pest and disease** – crop yield depend on free from insect infestation and disease. One of the phenomena occurring in crop production system which are highly dependent on farm labour is increasing incidence of pest and plant disease. The loss of labour as a result of AIDS has reduced the amount of time, care and cash required to effectively carry out cultural practice and or pesticide used in particular small scale farmers.

Furthermore Crop yield is also depending on technical and institution factor which have an impact on small scales farmers' crop yield particularly HIV/AID infected person. Some of these technical and institutional factors that have negative impact on crop yield of are:

**7. Technical change in agriculture** – technical factors contribute towards providing good quality crop yield to the farmers and to the consumers. In agricultural production and marketing, small scale farmers tend to be lagging in the use of improved technology. Machethe (2004) pointed out that most small scale farmers in south Africa lack appropriate transportation facilities and road infrastructure, communication links and storage. Further small scale farmers have limited ability to add value to their crop yield. Lack of such facilities usually constrains farmers supply response to any incentive in both agricultural production and marketing (Dorward et al, 2003)

**8. A storage facility –** The ability to deliver a quality crop yield to market commands buyer attention and give the grower a competitive edge (Bachmann & Earles, 2000). Proper post-harvest handling and storage contribute in ensuring quality maintenance for perishable agricultural produce. Moreover, agricultural crop yield harvested at a specific point in time, but are consumed year round, thus necessitating proper storage facilities. Therefore, if crop are to be available for consumption throughout the year, proper storage facilities have to be implemented by both farmers and traders. However most small scale farmers particularly HIV/AIDS infected people do not have access to adequate storage infrastructure due to morbidity and mortality and end up selling the little crop produce at their possession soon after harvest as they also need money for their health care.

**9. Road infrastructure** – Agricultural crop produce most move from the farms where they are grown to the retail outlets where they are bought. Road infrastructure and transport availability have influence on small scale farmers crop yield market participation especially if they are located distance from consumption centre. According to Bachmaan & Earles (2000) one of the most important constrains facing agricultural markets and farmers throughout sub-Saharan Africa is transport infrastructure and the need to reduce transport. The majority of the village in rural area are served by inadequate and poorly maintained roads network.

**10. Market infrastructure** – small scale farmers usually served by poor market infrastructure. In some instance, market infrastructure is unavailable and farmers sell from the back of their trucks (Makhura, 2001). These conditions are not conducive for fresh produce, contributing to perishability and loss of produce. Additional crop yield sold under poor market condition may not be attractive to consumers, putting farmers at risk of losing customers. Fresh produce tend to have a limited shelf life, they cannot be stored for longer period which implies that such produce need to be processed or to be sold while it is still fresh.

**11. Market transport** – The absence of mechanical transport poses serious problem for marketing of agricultural produces. It is difficult to transport produce in time, to the market, if there is no reliable private form of transport, since the public vehicle tend to be few in rural areas (Bauchmann, 2000). Inability to transport produce in time may result in crop production spoilage & losses particularly perishable crop. In addition, unavailability of reliable private transport may increase transport costs, which in turn increase transaction costs among small scale farmers. This high costs will then reduce the incentive to move away from gates sale.

It is important at this conjure to note that from the factors constrains to the farmers crop yield highlighted above, rainfall, type of soil, drought has nothing to do with AIDS as it cannot altered.

To conclude this literature, it is prudent that in order to secure sufficient crop cultivation that can sustain every segments of the society in awake of current HIV/AIDS crisis both in urban and rural area, attention must be focused by both researchers, policy makers, well meaningful individuals in the society to tackle AIDS related problem in the society. By doing so, it would contribute to reducing vulnerability of men, women, boys and girls and rescue our society from the menace of the HIV/AIDS epidemic that can lead to less infection, more labour, adequate food security and overall wellbeing of household.

## Chapter 3: Methodology

The study had used the following method in collecting data for this research work:

**3.1 Literature review /desk study–** The study had used literature related to the sub questions of the research from internet, textbooks, departmental publication, journals as a secondary source of data for the research.

### 3.2 Research Strategies

The study had an exploratory and descriptive design. Primary data was collected through a case study strategy. Due to stigma/ discrimination and the sensitive nature of collecting data in HIV/AIDS affected households, the study had used proxy indicator of chronically ill households to collect the data. Proxy indicator is variable, which purpose it is to measure change in a phenomena or process (USAID, 2001)

### 3.3 Study area

The study was conducted in Jabarmari, Hadamari district of Jere L.G.A, Borno state. It had a population of 78,107 people (45,053.5 males and 33053.5 females), and 70 % of the residences were small scale farmers. 90 % of the population are migrant settlers from other part of the federation because of fertile nature of the area and promising Fishing River. The village had 255, 000 hectares of fertile land for cultivation and irrigation, Jere LGA, (2010). It is one of the fishing /irrigation communities in the state. Majority of the residence are Hausa speakers although there are other tribe who are indigenous of the state. Figure 1.0 is the picture of the village.

**Figure 2: picture of Jabarmari Village**


### 3.4 Justification for selecting the Village

Jabarmari was selected as a study area because of the following reasons:

I. The study area falls within the focal unit (UMTH, SSH, NH unit) with the highest HIV/AIDS infected people. According to BOSACAMA, (2010) the focal unit had 19,972 registered HIV/AIDS positive people and 15,972 people on ARTS.
II. Majority of this people are small scale farmers engage in cultivation of cereals and legumes.

### 3.5 Use of research assistance

Two (2) extension agents (one male and one female) were involved during the data collection to serve as research assistants. The male extension agent was assigned to take notes (minutes) of the interview while the female was to assist in interviewing restricted

households for male although such cases has not been encountered. The decision to use gender mix was in anticipation of household where the respondent would not be free to be interviewed by either male interviewer or vice versa.

**3.6 Selection criteria of respondents:** This is the criteria used for selecting respondent during the data collection.

**(i) Male headed households:**
Twenty five (25) Male headed households were randomly selected and interviewed for the study. The reason behind why all are male headed household is because of issue of access to the female headed household. In the village all widows and divorcee live with their parents or relatives. To get access one must get the permission of male head of the household.

**(ii) Chronically ill household** - A total of twenty five (25) chronically ill members of the households were interviewed, except in six (6) households where the wife of the male heads was interviewed who were also sick as their husband were in a critical sick situation.

**(iii) Selection** - The selection and identify of chronically ill households were assisted by two extension agents who were working and live in the village, together with the chairman of the farmers' association and ward head.

Three out of the twenty five chronically ill household respondent interviewed were not cooperated fully to answer all the question asked at the initial stage of the interview but later all agrees to answer the question. The reason for their refusal to answer fully all the question according to one of the respondents that they granted several interviews conducted in their areas without having seen any benefit while the other two were concerns for their security.

**3.7 Farmers interview**
The justification behind conducting an in-depth interview with farmers was to get first-hand real life information that are relevant to the study in order to understand the impact of HIV/AIDS to the livelihood of small scale farmer's crop yield. As stated under the selection criteria a total of 25 chronically ill household members were interviewed except in 6 (six) households where wife of the male head household were interviewed who were also as their husband critically sick. The interview was conducted using topic list (checklist questionnaire). A common set of question were used for all the household households members interviewed.

**3.8 Focus group discussion**
The rationale behind conducting FGD was to obtain additional information to enrich the others data for the research. One focus group discussion with six respondents (5 male and 1 female) was conducted. They were selected among the 7 chronically ill people who disclose their HIV/AIDS status at the earlier (first phase of the interview). The disclosure of the status was in an informal way by the respondents. All the six AIDS affected persons had disclosed that they abandon farming because they lack resources to carry out farming. The researcher moderated the focus group discussion with the help of research assistant who took the note (minutes) while holding the focus group discussion. The discussion were carried out in two days and lasted for two hours each day. The discussions were held in the chairman of Jere farmer's association residence which was a familiar venue to the entire participant.

**3.9 Key informants interview** - The reason for conducting key informants interview was to get expert knowledge on the impacts of HIV/AIDS on the livelihood of small scale farmers

crop production.The reseach had hold three saperate key informants interview with 2 local government official at Jere local government, 2 BOSADP officials and 2 extension agents who worked and live in the village. All these interviews were self admnistered with the used of topic lists.

**3.10 Observations -** Observation allows the researcher to study people in thier natural setting without thier behaviour being influenced by the presence of the reseacher. Observations was also used during the study.

**3.11 Data analysis**

The data collected were presented and analysed through descriptive method of data analysis and also use of table and frequencies.

**3.12 Limitation**

Due to the insecurity in the state access to 2 key informants at Jere local government were delayed as their offices closed because of military crackdown in the area. Secondly interview was not recorded on tape for fear of encountering with insurgence and military brutality and drastic financial difficulty was also faced as cost of transportation was very high.

## CHAPTER 4: RESULTS AND ANALYSIS

### 4.1 introduction

This chapter shows the result and analysis of data collected from primary source (field work). The results are presented with the use of tables and frequencies. Descriptive methods of data analysis were used as articulated below.

### 4.2 Position of households members

As stated in chapter 3.6 above, All the 25 household members interviewed were from male headed household and are chronically ill except in six households were the wife's of the male heads were interviewed as they were also sick and their husband are critically ill. The selection of majority male respondent than females could be a personal bias on part of the researcher. If all were given equal chance the views could have been different.

#### 4.2.1 Health status of households

One of the main advantages of data collected through household survey was that; it provided person or households based health statistic rather than data collected through health service or disease registries. Table 2 shows age of respondents per category and sex

**Table 2 position of households members**

| | Age of respondents per category and sex | | | |
|---|---|---|---|---|
| Sex | 18 – 29yrs | 30 - 49 | 50 above | **Total** |
| Male | 11 | 5 | 3 | **19** |
| Female | 4 | 1 | 1 | **6** |
| **Total** | **15** | **6** | **4** | **25** |

Table 2 above shows the age of respondents per category and sex interviewed. Out of the 25 household members interviewed, 11 are male age 18 – 29 years who were the active members of the household exposed to HIV/AIDS related morbidity in the study households than the females. It's also shows 4 chronically ill members were at age 50 and above who were ignored in most studies. The result further revealed that the level of infection among male is high than female and it is about 10 % than 5.6 state HIV/AIDS prevalence rates when compared.

#### 4.2.2 Household size of respondents

The study shows that, out of the 25 members interviewed, there are 239 households members. The maximum number of persons in each household is 15 people and minimum is 6 people in each household selected.

**Table 3 Households size of respondents**

| age | Male No | Female No | Total |
|---|---|---|---|
| <14 | 81 | 54 | 135 |
| 15- 50 | 49 | 55 | 104 |
| >50 | - | - | - |
| **Total** | **130** | **109** | **239** |

From table 3 shows that there are more boys than girls in the studied households. The ration of boys to girls is 2: 1. The dependency ration in the study household is 233.3 % maximum and 60 % minimum which is higher against the state dependency ration of 86.2 %.

### 4.2.3 Sources of livelihood and gender division

Livelihood is a means of making a living. It encompasses people's capabilities, assets, income and activities required to secure the necessities of live. From the study the following is the means of livelihood of the household and gender division of labour.

**Table 4 Source of livelihood and gender division of labour**

| Source of livelihood | | | |
|---|---|---|---|
| | | Responsible Person cultivating in the HH | |
| Crops (cereals) | | Man | Woman |
| | Millet | ✓ | ✓ |
| | Rice | ✓ | |
| | Sorghum | ✓ | |
| Legumes | Cowpea | ✓ | ✓ |
| | groundnut | ✓ | ✓ |
| | Bambara nut | ✓ | |
| | Okra | | ✓ |
| Fishing | Fish catch | ✓ | |
| | Fish processing | | ✓ |
| | Fish net | | ✓ |
| Gardening | Vegetables | | ✓ |
| | Cassava | ✓ | |
| | Sorel | | ✓ |
| Poultry | Chicken | | ✓ |
| | Goats/sheep | ✓ | |
| | Bull patterning | ✓ | |
| Trading | Petty trading | ✓ | |

Table 4 above indicate who is responsible what to cultivate in the household. Men were cultivating economic crops and those that demands heavy labour while the females were cultivating less economic crops and with less labour. During interview 76 % of the male respondent interviewed stated that Cereals and legumes, fishing, Bull patterning, petty trading are the major sources of their livelihood for the past 30 years when they migrated to the village. While 24 % of the female respondents state that millet, cowpea, groundnut, tailoring, rice per boil processing, making of fishing net, vegetable and gardening, poultry(chicken, goats/sheep rearing, are major sources of their livelihood.

Each of this crops vary in demanding labour for cultivation and the crop that demand high labour is rice while those that demand less labour is sorrel and Okra. From the study it show women were more cultivating those demand less labour and men do those that demand high labour and resources.

Thus study shows that men tend to be main producers of food including commercial crops (Rice, cowpea, groundnut) although not without women support. Majority of the women were confined to a household and were engage in less productive economic activities.

### 4.3.1 Labour

Subsistence small agricultural farming requires a regular supply of labour. The various sources of farm labour are shown in table 5 below.

**Table 5 Farmers sources of labour**

| Source of labour | Households (N=25) | Per cent (%) |
|---|---|---|
| Household members | 27 | 87.1 % |
| Hired labour | 2 | 6.5 % |
| Hired tractors | 0 | 0.0 % |
| Livestock to plough | 1 | 3.2 % |
| Family assistance of labour | 1 | 3.2 % |
| Total | 25 | 100 % |

From table 5 above shows the sources of labour for household. During the interview with farmers over 87% of the households rely on members of the household as source of labour for the farming. The family assistance of labour is not widely used. Furthermore, the respondents stated that it is out of their reach and too expensive for them to hired tractors or use livestock to cultivate their farm land thus led to reduction in land cultivation and crop yield.

### 4.4.1 Impacts of AIDS

AIDS can affect agricultural production in many ways. Its include decline in area of cultivation, reduction of overall agricultural output in households in terms of crop production as a result of illness and death from HIV/AIDS related diseases. The study shows the following in table 6, 7 and appendix 6 attached.

**Table 6 Farmers household Deaths**

| | Number of household members passed away per age category in the last 5 years | | | | |
|---|---|---|---|---|---|
| Sex | 0 - 14 | 15 - 29 | 30 – 49 | 50 above | Total |
| Male | 25 | 3 | 1 | 1 | |
| Female | 9 | 2 | 1 | 1 | |
| Total | 34 | 5 | 2 | 2 | 43 |

From Table 6 above shows the number of deaths in the household of chronically ill people after becoming ill. The result revealed that there is high number of HIV/AIDS related death in the study. The most affected is age 0 – 14 and could be a mother to child transmission and other killer disease like meningitis. The death rate is high among the males who are the most productive members of the community. The death number among male to the females is at the ratio of 5 to 1. This means the male are more exposed to HIV/AIDS than the female.

### 4.4.2 Reduced land cultivation

Table 7 below shows the reduction in land cultivation due to AIDS related illness and death. The AIDS epidemic result in reduction of area of crop cultivation and further reduced crop yield as agricultural work is neglected or abandoned due to household illness & death. From the study conducted, it shows that the various households interviewed have experienced substantial reduction in area of crop cultivation. Table 7 indicate that a household cultivate 131 acres of land before the illness and death but has now been reduced to 41.1 acres of land after illness and death. There is reduction of 113 acres in the total land cultivated which about 86%.

**Table 7 Size of land cultivated before and after becoming Ill**

| ILLness | | | | | | | Death | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Male | | | Female | | | Total | Male | | | Female | | | Total | Cultivation of land | | | | (5)Cult. Abandoned |
| | | | | | | | | | | | | | | Before | After | | | |
| 18-29yrs | 30 - 50 yrs | 50 yrs abo | 18-29yrs | 30 - 50 yrs | 50 yrs above | | 0 - 14 yrs | 15 - 49 yrs | 50 yrs abo | 0 - 14 yrs | 15 - 49 yrs | 50 yrs above | | Acres | Acres | Acres increased / reduced | % Acres increased / reduced | |
| 1 | | | | | | 1 | 1 | | | | | | 1 | 5.12 | 2 | -3.12 | -60.9% | |
| | 1 | | | | | 1 | 1 | | | | 1 | | 2 | 7.41 | 0 | -7.41 | -100.0% | 1 |
| | 1 | | | | | 1 | 1 | | | 1 | | | 2 | 4.94 | 1 | -3.94 | -79.8% | |
| 1 | | | | | | 1 | 1 | | | 1 | | | 2 | 6.17 | 1 | -5.17 | -83.8% | |
| | | 1 | | | | 1 | 1 | | | | | | 1 | 12.35 | 0 | -12.35 | -100.0% | 1 |
| | | | 1 | | | 1 | 1 | | | | | | 1 | 12.35 | 2 | -10.35 | -83.8% | |
| | | | 1 | | | 1 | 1 | | | | | | 1 | 8.64 | 2 | -6.64 | -76.9% | |
| 1 | | | | | | 1 | 1 | 1 | 1 | 1 | 1 | | 5 | 4.92 | 0.5 | -4.42 | -89.8% | |
| | | | 1 | | | 1 | 1 | | | | | | 1 | 4.92 | 1 | -3.92 | -79.7% | |
| | | | 1 | | | 1 | 2 | | | | | | 2 | 7.41 | 2 | -5.41 | -73.0% | |
| 2 | | | | 1 | | 3 | | | | | | | 0 | 8.64 | 0 | -8.64 | -100.0% | 1 |
| | | | | | | 0 | 3 | | | | | | 3 | 1.7 | 6.17 | 4.47 | 262.9% | |
| 1 | | | | | | 1 | | | | 1 | | | 1 | 6.17 | 1.6 | -4.57 | -74.1% | |
| | 1 | | | | | 1 | 1 | | | | 1 | | 2 | 3.7 | 0.5 | -3.2 | -86.5% | |
| | | | | | | 0 | | 1 | | 1 | | | 2 | 1.5 | 7.41 | 5.91 | 394.0% | |
| 2 | | | | | | 2 | | | | | | | 0 | 7.41 | 2 | -5.41 | -73.0% | |
| | 1 | | | | | 1 | 1 | | | 1 | | | 2 | 1.5 | 6.17 | 4.67 | 311.3% | |
| 1 | | | | | | 1 | | | | 1 | | | 1 | 4.94 | 1 | -3.94 | -79.8% | |
| | | 1 | | | | 1 | 1 | | | 1 | | | 2 | 6.16 | 1 | -5.16 | -83.8% | |
| 1 | | | | | | 1 | | 1 | | | | | 1 | 6.17 | 1 | -5.17 | -83.8% | |
| | | 1 | | | | 1 | 2 | | | | | | 2 | 4.94 | 0 | -4.94 | -100.0% | 1 |
| | | | | | 1 | 1 | 2 | 1 | | 1 | | | 4 | 7.41 | 1.5 | -5.91 | -79.8% | |
| 1 | | | | | | 1 | 1 | | | | | | 1 | 4.94 | 0 | -4.94 | -100.0% | 1 |
| | | | | | | 0 | 2 | | | | | 1 | 3 | 8.64 | 2 | -6.64 | -76.9% | |
| | 1 | | | | | 1 | 1 | | | | | | 1 | 7.41 | 0 | -7.41 | -100.0% | 1 |
| 11 | 5 | 3 | 4 | 1 | 1 | 25 | 25 | 4 | 1 | 9 | 3 | 1 | 43 | 131.82 | 41.85 | -113.61 | -86.2% | 6 |
| 11+5+3=19 | | | 4+1+1= 6 | | | | 25 + 4 +1 = 30 | | | 9 + 3 + 1 = 13 | | | | | | | | |
| 19+6=25 | | | | | | | 30 + 13 = 43 | | | (1) HHS - Household | (2) Yr - ye | | (3) HHS Abandoned | | 3 | (4) Crop increased | 4 | (5) Cult - Cultivation |

The data further shows that 6 households out of 25 interviewed abandoned crop cultivation. The reason could be assumed as a coping strategy since cultivation of crop like millet, sorghum, rice demand high investment of money and energy. From the information of years of their sickness it has been observed such households sickness was prolong for quite some time. It is also revealed from the study that 3 out of the 25 household have increased their area of crop cultivation, it assume due less number of dependency and possible recuperating from time line of HIV/AIDS.

### 4.4.3 Reduced Crop production per Household

**Crop production**

This study has found a significant reduction of crop production in households that experience illness and death due to reduction in area of crop cultivation as shown in table 7 above. Table 8 below shows the details of the reduction. The crop that most affected by this in reduction of crop yield is millet and rice which is about 60% and 79% reduction. For more details including household illness and death as well as area of land cultivation reduced plus crop yield reduction see appendix 6 attached below

**Table 8: Crop production reduced**

| | | | | crop yield | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cultivation of land | | | | | | | | | | | | | | |
| Before | After | | | (5)Cult. Abandoned | Crop yield cultivated Before | | | | Crop yield cultivated After | | | | | |
| Acres | Acres | Acres increased / reduced | % Acres increased / reduced | | Millet | Rice | sourghum | legumes | Millet | Rice | sorghum | legumes | increased / reduced yield | % |
| 5.12 | 2 | -3.12 | -60.9% | | 6955.0 | 0.0 | 0.0 | 0.0 | 2716.8 | 0.0 | 0.0 | 0.0 | -4238.2 | -60.94% |
| 7.41 | 0 | -7.41 | -100.0% | 1 | 7230.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -7230.0 | -100.00% |
| 4.94 | 1 | -3.94 | -79.8% | | 0.0 | 4368.0 | 0.0 | 0.0 | 0.0 | 884.2 | 0.0 | 0.0 | -3483.8 | -79.76% |
| 6.17 | 1 | -5.17 | -83.8% | | 0.0 | 5460.0 | 0.0 | 0.0 | 0.0 | 884.9 | 0.0 | 0.0 | -4575.1 | -83.79% |
| 12.35 | 0 | -12.35 | -100.0% | 1 | 10920.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -10920.0 | -100.00% |
| 12.35 | 2 | -10.35 | -83.8% | | 0.0 | 10920.0 | 0.0 | 0.0 | 0.0 | 1768.4 | 0.0 | 0.0 | -9151.6 | -83.81% |
| 8.64 | 2 | -6.64 | -76.9% | | 0.0 | 7644.0 | 0.0 | 0.0 | 0.0 | 1769.4 | 0.0 | 0.0 | -5874.6 | -76.85% |
| 4.92 | 0.5 | -4.42 | -89.8% | | 0.0 | 0.0 | 0.0 | 3434.0 | 0.0 | 0.0 | 0.0 | 349.0 | -3085.0 | -89.84% |
| 4.92 | 1 | -3.92 | -79.7% | | 0.0 | 4368.0 | 0.0 | 0.0 | 0.0 | 887.8 | 0.0 | 0.0 | -3480.2 | -392.00% |
| 7.41 | 2 | -5.41 | -73.0% | | 0.0 | 0.0 | 4242.0 | 0.0 | 0.0 | 0.0 | 1144.9 | 0.0 | -3097.1 | -73.01% |
| 8.64 | 0 | -8.64 | -100.0% | 1 | 0.0 | 0.0 | 0.0 | 7644.0 | 0.0 | 0.0 | | 0.0 | -7644.0 | -100.00% |
| 1.7 | 6.17 | 4.47 | 262.9% | | 0.0 | 0.0 | 3420.0 | 0.0 | 0.0 | 0.0 | 12412.6 | 0.0 | 8992.6 | 262.94% |
| 6.17 | 1.6 | -4.57 | -74.1% | | 5460.0 | 0.0 | 0.0 | 0.0 | 1415.9 | 0.0 | 0.0 | 0.0 | -4044.1 | -74.07% |
| 3.7 | 0.5 | -3.2 | -86.5% | | 0.0 | 0.0 | 3001.0 | 0.0 | 0.0 | 405.5 | 0.0 | 0.0 | -2595.5 | -86.49% |
| 1.5 | 7.41 | 5.91 | 394.0% | | 0.0 | 3500.0 | 0.0 | 0.0 | 0.0 | 17290.0 | 0.0 | 0.0 | 13790.0 | 394.00% |
| 7.41 | 2 | -5.41 | -73.0% | | 0.0 | 0.0 | 0.0 | 4242.0 | 0.0 | 0.0 | 0.0 | 1144.9 | -3097.1 | -73.01% |
| 1.5 | 6.17 | 4.67 | 311.3% | | 0.0 | 0.0 | 3001.0 | 0.0 | 0.0 | 0.0 | 12344.1 | 0.0 | 9343.1 | 311.33% |
| 4.94 | 1 | -3.94 | -79.8% | | 0.0 | 0.0 | 0.0 | 4660.0 | 0.0 | 0.0 | 0.0 | 943.3 | -3716.7 | -79.76% |
| 6.16 | 1 | -5.16 | -83.8% | | 5440.0 | 0.0 | 0.0 | 0.0 | 883.1 | 0.0 | 0.0 | 0.0 | -4556.9 | -83.77% |
| 6.17 | 1 | -5.17 | -83.8% | | 0.0 | 5435.0 | 0.0 | 0.0 | 0.0 | 880.9 | 0.0 | 0.0 | -4554.1 | -83.79% |
| 4.94 | 0 | -4.94 | -100.0% | 1 | 5460.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -5460.0 | -100.00% |
| 7.41 | 1.5 | -5.91 | -79.8% | | 10920.0 | 0.0 | 0.0 | 0.0 | 2210.5 | 0.0 | 0.0 | 0.0 | -8709.5 | -79.76% |
| 4.94 | 0 | -4.94 | -100.0% | 1 | 0.0 | 0.0 | 5460.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -5460.0 | -100.00% |
| 8.64 | 2 | -6.64 | -76.9% | | 76440.0 | 0.0 | 0.0 | 0.0 | 17694.4 | 0.0 | 0.0 | 0.0 | -58745.6 | -76.85% |
| 7.41 | 0 | -7.41 | -100.0% | 1 | 0.0 | 0.0 | 0.0 | 10920.0 | 0.0 | 0.0 | 0.0 | 0.0 | -10920.0 | -100.00% |
| 131.82 | 41.85 | -113.61 | -86.2% | 6 | 128825.0 | 41695.0 | 19124.0 | 30900.0 | 24920.8 | 24771.2 | 25901.6 | 2437.2 | -142513.1 | |
| | | | | | | | | | | | | | | |
| Keys | 1 | abandoned cult | 2 | Crop increase | | | | | | | | | | |

### 4.4.4 Farm Implements

With regards to farm implement, it has been observed during interview with farmers that the type of farm implement use are Hoe, rake, cutlass, axes, diggers in an dilapidated stage for most of the chronically ill household. While heavy farm implement like tractors were seen not in used. Lack of having the right farm implement coupled with shortage of labour results in less cultivation and less crop yield. When asked how they can weed their farm when almost all their farm implement are broken. They stated that their major priority is how to survive with this unending sickness. They further stated that even the farm implement is there where the strength (energy) to cultivate the farm is. Table 9 is the farm equipment observed in a dilapidated stage.

**Table 9: Farm implements not in use**

| Farm tools | Usage | Condition of the farm tool observed |
|---|---|---|
| Hoe | Use for cultivation | Not in good condition |
| Axe | Use for clearing of land | " " |
| Rake | Use for seeping of weeds | " " |
| spade | Use for levelling eroded side | " " |
| Shovel | Use for levelling of holes | " " |
| Cutlass | Use for cutting | " " |
| Offset harrows | Use in harrowing land | " " |
| Disc plough | Use for ploughing | " " |

### 4.5.1 Impact of AIDS on plot management

During interview with farmers and focus group discussion it has been revealed that all chronically ill household interviewed had loss substantial amount of labour due to illness and death in their homes, which is vital for the cultivation of their farm land.

For farmers to cultivate sufficient crop yield, the farm should be free from pest, disease, weeds, and necessary farm inputs like fertilizer has been applied. During field visit one of the HIV/AIDS infected person farm, it has been seen that his farm was weedy and unable to source money to get hired labour to weed his farm. This will reduce crop yield and the weeds would expose such crops to pest and diseases. Furthermore the weeds would also compete for the nutrients, soil moisture with the crop there by affecting the crop yield.

Figure 3 below shows differential in farm of HIV/AIDS infected person and those of the non-infected people due to labour shortage. The farm of those non infected people can be seen well weeded that can retain moisture content of the soil but the farm of the HIV/AIDS infected person was not weeded and the crops are about to dry due to competition of the little moisture from the soil by weeds as rain fall was also very low in the area.

**Figure 3 Difference in plot management of infected and non-infected persons**


Furthermore during a visit to another chronically ill person farm land one can also see a clear difference between the farm of those chronically Ill and those of non-infected persons farm land as shown in figure 4 picture “A” and “B” below. The non-infected person water melon farm land “picture A” is tidily weeded and one can see the glimpse of fruits of the watermelon. But for the HIV/AIDS infected person “picture B” you see that the cassava farm land is covered with goat weed feed (Seporia fallieds) and looks untidy.

**Figure 4: Comparing farm of HIV/AIDS infected person and non-infected person**

### 4.5.2 Impacts of AIDS on houses

From the observation, it has been further observed that differentials vulnerability among the HIV/AIDS infected people interviewed was also very clear by comparing the type of house they live, and the structure look like when compared with non-affected households. Figure 5 the type of building and structure they possess.

**Figure 5: comparing House of HIV/AIDS infected person and Non Infected person**

p



From figure 5 pictures "A" is HIV/AIDS infected persons House and Picture "B" is for HIV/AIDS non-affected people house. One can clearly see that there is difference in term of structure of the building, materials used for the building between the infected persons house "A" and non-infected house "B". This is because the HIV/AIDS infected person lack energy and other resources to build the house with clay and zinc or thatches due to labour demand and money involved. While for the non-infected households the room were constructed with use of Muds and cover the roof of the room with zincs because they have the resources and energy.

### 4.6.1 Gender division of labour

All societies exhibit some degree of division of labour by gender. These divisions continue to exist as participation in paid work has increase over time. Gender divisions occur between household tasks, between unpaid work, and within paid work.

**Table 10: Gender division of Task in households**

| Gender Division of task by sex | Responsible Person | | | |
|---|---|---|---|---|
| Activities | Man | Woman | Boy | Girl |
| Coking | | X | | |
| Child care | | X | | |
| Family health care | X | X | | |
| Collecting firewood | | X | | X |
| Subsistence farming | X | X | | X |
| Winnowing | | X | | X |
| House clearing | | X | | X |
| House building | X | | | |
| Household | X | | | |
| shopping | X | | | |
| Fetching water | | X | X | X |
| **Total activities per Person** | **6** | **7** | **2** | **4** |

Table 10 shows gender division of task within a household. During interview with farmers, it was revealed by 100 % of the respondents that the traditional division of labour by task within a household is on who do what in the household. Women, Children both boys and girls are all assign task at the household. Women were assign roles on providing household hold care and maintenance. Such roles include cooking, fetching water, house clearing among others that concentrate within the household. While the men are primarily responsible in providing economic support, work that need energy and wider contact with outside community member. However due to morbidity and mortality such activities and roles assigned in the household has been strangle in various households interviewed.

The result of the research further gathers that, in terms of other domestic work, there is also clear distinction between what women do and men do. Men engage in building houses, fence, rearing of animals, taking care of the granary while the women's, winnowing including with their children and tailoring to get some little money for home use. Figure 6 below shows Women and their children doing winnowing of rice.

**Figure 6: winnowing of rice by women and their children**


### 4.6.2 Decision making

Decision making is the process by which families make choices, judgement and ultimately come to conclusions that guide behaviour. Household decision –making implies that more than one member input and agreement is involved. Table 11 below is gender division in area of decision making within household i.e. who is responsible for what.

**Table 11: Decision making In Households**

| Gender division in area of decision making | | |
|---|---|---|
| | Responsible Person in the Household | |
| Activities | Man | Woman |
| Food preparation | | X |
| Care for the children | | X |
| Crop to be grown | X | |
| allocation of task in the HH | X | |
| Children education | X | |
| Household expenditure | X | |
| Children marriage | X | |
| crop produce to be sold | X | |
| Crop to be stored | X | |
| Crop prouced to be control | X | |
| Land sold/purchase | X | |
| Type of animal to be reared | X | |
| Animal to be sold | X | |

Decision making within household has to do with bargaining and this bargaining depend on the capacity of the parties; this capacities are not natural but most are human product. These have led to allocation inefficiency especially in labour resources that are labour enhancing. From the result of interview conducted all the 6 female respondent interviewed stated that men's as the head of the household responsible for the entire decision making in the household. The decisions could be on crop to produce, sell, how much to be sell out of the harvest, decision on how to use the money generated including from the one they generated out of their petty business like, fishing net making, tailoring and decision on what to do or crop to grown. During triangulation they stated that as Muslim women, they are bound by the Islamic injunction to obey whatever their husband says with regards to domestic issue. This has an impact on the entire household and crop production. However as most household occupied by one incident of sickness or death, the female once are more affected as most decision is taken by the men.

### 4.6.3 Care for the sick

Another task within the household is care for the sick once. Table 12 provide the details.

**Table12: Care for the sick**

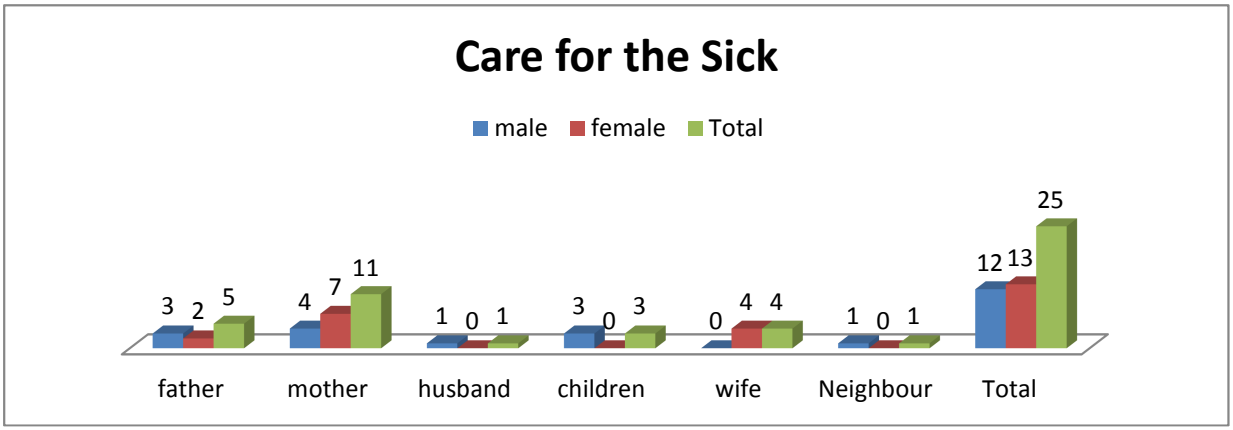



Table 12 above; shows the breakdown of those cares for the sick persons. Both from the interview with farmers and focus group discussion revealed that 11 of the respondent are cares by their mothers (both male and female), while 6 are cared by their father, those cared by children and wife are 5 people each respectively, and those cared by husband and neighbour 1 each.

Also from Observation of the researcher, during the interview with farmers, it has been observed that all household interviewed were male headed households and 52 % of the sick once are given care by the female; While 48 % of the sick once are given care by men. It is also observed that all married women who their sickness prolong were returned to their father houses by spouses because their spouses said to be no longer render care and treatment to the wife and 12 % of those looking after the sick once were children's.

### 4.7.1 Assets

From the interview with farmers conducted 80.6% (#25) stated that they have sell almost all of their asset in buying drugs, paying transportation money to visit clinics and looking medicine from traditional herbalist at the expense of farm inputs and feeding. This had far reaching consequence to the crop production because it retard farm cultivation and reduce crop yield. While 19.4 %( # 6) of the respondents stated that they did not dispose any of their assets because they have the helping hand of their relative, children and friends.

### 4.8.1 Crop diversity

During the field visit it has been observed that farmers do intercropping millet with beans and from personal experience of the researcher people use to inter-cropping millet, cowpea, sorghum and groundnut to boost crop yield and reduced risk in event of one crop fail or infected with pest or disease. When farmers were asked what other activities can they do to increase farm yield or prevent from pest and diseases, they stated that by diversify and intercropping would increase crop yield as each crop supplement one another with nutrients and keep the soil moisture.

### 4.9.1 Income and expenditure

From the interview with farmers conducted, all the households (N=25) use various sources of income to meet their household and farming needs. Table 13 below show the sources of household's income.

**Table 13 Sources of income**

| Sources of income | Households (N=25) | Per cent (%) |
|---|---|---|
| Sales of farm produce | 16 | 51.6 % |
| Sales of assets | 14 | 45.2 % |
| barrowing | 0 | 0.0 % |
| Assistance family & friends | 1 | 3.2 % |
| Total | | 100 % |

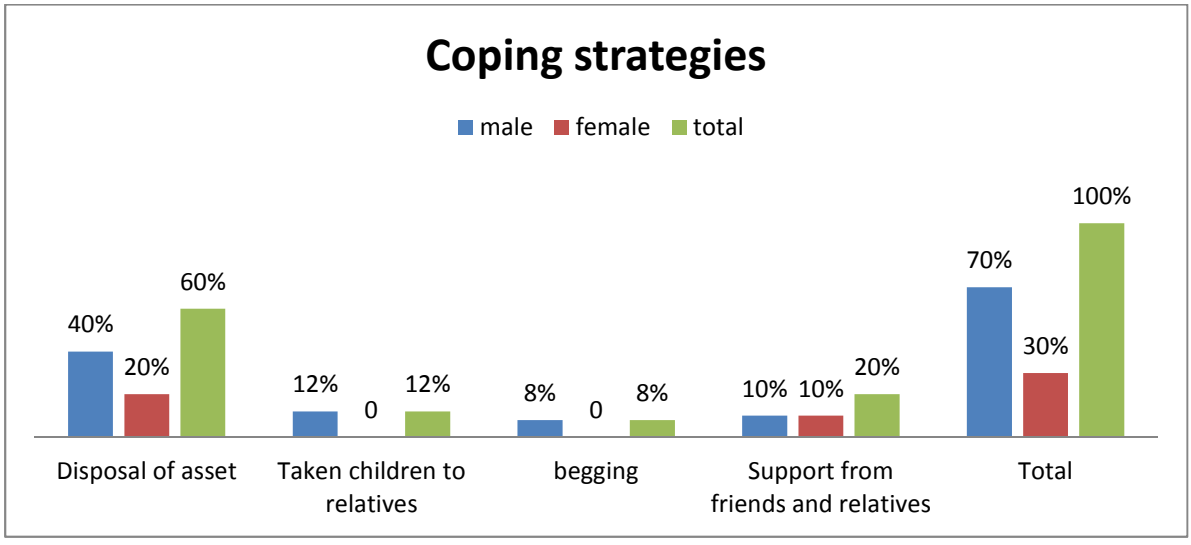
Table 13 above indicate that during interviewed with farmers due to illness and death in their households, they experienced high reduction of income and increase in expenditure. They stated that the farm is no longer viable as cultivation of farm lands reduced both in farm size and crop yield due to diversion of money for farm inputs to purchase of drugs. Secondly the farm inputs are difficult to get due to competition between those has wealth and high price in the market. The little money in their savings including that of disposed assets are all goes to the purchase of drugs and transportation from home to clinic at the expense of farm cultivation there by under mining crop yield.

During focus group discussion triangulation it was revealed that household sell their farm produce to raise income for the purchase of drugs. This little income is used to meet the daily higher expenditure of the household while the farming activities was neglected thus reduce crop yield

### 4.10.1 Coping strategies

Coping strategies are used by people to manage and defuse stressful situation they find themselves in their respective households, but they are not a permanent solution and not all equally efficient at this task.

**Table 14: Coping strategies**




From table 14 shown above there are various coping strategies used by the chronically ill households. 40 % among the male respondents stated that they disposed their asset to cope with the illness or death in the household at the expense of farm input and feeding, 12 % stated that they take their children to relative to relief them from the burden of feeding, paying school fees and treatment in case of sickness and both 8 % of men and 10 % among

male respondent further stated they resort to begging and asking support from friends and relatives to cope with the impact of the illness or the death. While 20% of the female stated they dispose their asset, 10% of females seek support from relatives and friends in order to cope with the situation.

### 4.11.1 General support received by farmers

From the interview with farmers and focus group discussion conducted, all (100 %) of the respondents have stated that, they did not received any form of assistance from any formal or informal organisation. The only support they received is from relatives, friends and families of the AIDS infected persons. They also state that they do receive support from extension agent on farming issues. They describe the extension agents as partners in progress, without them many of their farming activities will suffer. However the chronically ill household demand for special intervention particularly for the HIV/AIDS people to reduce their hardship.

The farmers further requested the local government to provide them with farm inputs like fertilizer, improved seeds and seedlings, insecticides, farm implements like tractors at subsidised price and trashing machine but no avail. However when asked on role and support rendered to them by Borno state agricultural development programme, they stated that, The ADP had assisted in providing them with extension workers who will guide them on new method of farming techniques like recommended spacing, application and utilization of insecticide, link them to micro finance institution after organising them in to a viable groups, link them with their partners like National Fadama development, food security programmes, provide them with wash bores and tube well as well as construction of feeder road for them. These supports are not for chronically ill people or households alone but for the entire farmers in the locality.

### 4.12.1 Constrain and Challenges faced

All (100%) of the respondents both farmers interview and focus group discussion, stated that there are several challenges and constrain face by the small scale farmers. These include lack of support from local government council, state or any Non-governmental organisations, lack of farm inputs and farm implement, financial difficulties, crop insect infestations, invasion of farm land by Fulani herds men, droughts, and fluctuating rain season were the major constrain and challenges faced by the entire community.

### 4.13.1 Impact of HIV/AIDS to small scale farmers

From the interview with 2 key informants of extension agents who work in the area stated that there is enormous impact of HIV/AIDS to small scale farmers with their family due to high level of stigma and discrimination in the society couple with poor crop harvest. Many people died in silenced with their sickness for the fear of intimidation and rejection by their families and the community. They stated that if you mention word ”HIV/AIDS” people will immediately distance from you let along known to them that you are infected with HIV/AIDS. They further stated that those living with HIV/AIDS live in an immeasurable stress and hardship because of poor crop yield due to less cultivation of farm land. In recent days the general economic situation of the state coupled with insecurity in the state make this category of household suffers too much. They describe the situation of HIV/AIDS infected people as tragic, a real tremor and hardship from what is happing in the society. When asked the differential situation between men and women, they describe the female once as

tsunami (dejection from family, husband, even neighbours and everyone in the society.) they are seen as sinners and no respect for them.

From the 2 key informant of BOSADP officials, it was stated that the greatest concerned to small scale farmers in the state is the rate in which HIV/AIDS affecting farmers because it has serious implication to farming communities in the state. They stated that once a farmer is infected it will affect farming as a whole and reduce crop production particularly crop yield there by exacerbating poverty to many household in the state. The present trend in which HIV/AIDS is spreading is very disturbing because it had a negative impact for the whole society. While the 2 key informants of local government officials stated that HIV/AIDS is a serious issue need to be tackle by the local government because it retard crop production and degrade living standard of many infected people.

### 4.14.1 Role and support to small scale farmers living with HIV/AIDS

During the data collection, it was revealed that, extension agent play numerous role and support to toward small scale farmers particularly chronically ill once in the community. The extension workers stated that, they do offer range of services to the farmers by educating them on how to cultivate nutritious crops and other farming techniques that will make them improve and increase their crop yield to make them stand on their own. They also stated that they organised the farmers in to a viable groups and link them with microfinance to obtain loans for their farming. For the female once the extension agent female stated that in addition to the above service, they do trained women on nutritional improvement to reduce their hardship through food fortification using high protein value food for body building particularly to HIV/AIDS infected persons.

During the interview it was also revealed that the ADP actually plays two leading role toward small scale farmers in the state:

(1) Provision of nutritional improvement – the ADP provides training on nutrition improvement to all ill household in order to reduce their hardship. This is done through encouraging people to cultivate, utilize food with high protein value for body building.
(2) Youth empowerment activities – The ADP provide youth development scheme i.e. training the youth on skill acquisition scheme and provide them with much grants so as to develop their area of specialization. This has helped in reducing poverty, redundancy and delinquency which are major source that expose them to epidemic.

On the support of BOSADP to farmers both of the respondent stated that the ADP is the only organisation mandated by government with extension services to the people in the state. The extension delivery system is the major support by government toward small scale farmers.

For the role and support of the local government toward small scale farmers, it was revealed that they have no record as to number of infected people let alone the thing of how to support them. The politicians according the key informants are not interest in such kind of issue and it is not a priority to the local government. For the head of agriculture when asked on role and support of local government, he said as at movement, he has no record of this issue as he is just been posted to the local government. He reports knowing in his previous working place the support for vulnerable groups mainly HIV/AIDS infected peoples.

### 4.15.1 Challenges faced by Extension agent, BOSADP and Local Gov. Officials

During interview with key informants the following constrain and challenges faced were revealed. (a) The extension workers stated that, there are several challenge faced in executing their duties. This include lack of transport to visit farmers at appropriate time, lack of motivation (not paying their allowances) in time, non-adoption of new farming methods by some farmers, security, drought, desert encroachment and poor rain fall pattern in the locality are some of the immediate constrain and challenges faced by the officers.

(b) According to the 2 key informants interviewed with state ADP; that the Borno state agricultural development programme has a number of challenges and constrain in executing her statutory responsibilities: this include

(1) High turnover of programme managers – constant changes of the programme manager affect programme execution. You plan a programme before executing it has been change due to the change in leadership and style of approach.
(2) Lack of area specialization for the programme managers. Most programme managers appointed are not agricultural specialist and cannot understand the operation of the organisation.
(3) Lack of logistic support in the area of funding, transportation and materials.
(4) Lack of capacity building of the officials who conduct the activities of the programme
(5) Lack of cooperation on the part of the stakeholder toward small scale farmers activities.

(c) While for the local government officials, the following are challenges to the local government; Lack of deserved attention toward vulnerable people by the politicians, No improved seeds, pesticides, tractors to assist the farmers in boosting small scale farmer activities.

## Chapter 5 Data analysis

### 5.0 Introduction

This chapter analyse the result of the study presented in chapter four. Sheds more light on conclusion and recommendation based on the result and analyses presented on the research.

### 5.1 Illness and death

From the result of farmers household illness interview presented in table 2 in chapter 4, the study found that majority of the chronically ill people are male at the age category of 18 – 29. This finding is a great concerned to worry because all of them are small scale farmers and they are the most productive and active members of the society. This finding confirms to study conducted by Sheriff (2005) that HIV/AIDS is more prevalent among adolescents and young adult who incidentally, provide more than eighty per cent (80%) of agricultural workforce of the state.

Furthermore from farmer's household's number of members death in table 3 in chapter 4, it is further established that the 25 chronically ill household interviewed had witness death in their household numbering to 43 people both men, women and children. It indicates that there is high morbidity and mortality rate of HIV/AIDS in the studied households. According to food and agricultural organisation (FAO, 2011) it is increasingly clear that HIV/AIDS causing significant increase in morbidity and mortality in prime-age adults, increasing negative social, economic and developmental impact to community. The economic impact of HIV/AIDS at household level was to decrease productivity, capacity and change the expenditure patterns. Major survival strategies developed in response to the epidemic may include the altering household composition, the withdrawal of savings and sales of assets, the receipt of assistance from other households. Following death, the impacts break out households and in to community in form of increase number of dependant such as orphans. This has clearly concurred with the result of the study as 25 chronically ill household interviewed had dead members of family numbering 43 and 239 family members' dependant on them.

If any of the 25 chronically ill household members died, it bound to bring orphans, widowers and subsequently dissolution of the household. This has far reaching consequence to the affected households and community at large because its reduce cultivation of farm land and thereby reducing crop yield hence poverty.

### 5.2 Source of livelihood: Rural Livelihood

Agriculture is the mainstay of rural economies and the primary occupation of millions of people in many of the developing nations including Nigeria. The significant proportion of the population relies on farming as their main source of livelihood. From the result of the study its shows that 76 %( N=19) of the respondent male interviewed stated that Cereals (rice, sorghum, millet,) and legumes (cowpea, groundnut, Bambara nut), fishing, bull patterning, petty trading are the major source of their livelihood for the last 30 years. while 19 % (N=6) of the female respondents interviewed state that tailoring, rice per boil processing, making of fishing net, vegetable and gardening, poultry(chicken, goats/sheep rearing), beans, okra and sorrels farming) are the major sources of their livelihoods for the last 30 year. They are quick to add that vegetable gardening; poultry were started in the last 7-10 years when their husbands become ill.

It is relevant at this juncture to pinpoint that due to high number of morbidity and mortality as revealed from the finding of this study, its means that the livelihood for the Jabarmari community is in jeopardy because the morbidity and mortality had an enormous multiple impacts with wider ramification on agriculture and livelihood of the rural people as farming cultivation is retarded and crop yield diminishes. This is confirmed by Mutangadura, et al (1999) which summarised the impact of HIV/AIDs pandemic on agricultural production in rural area as follows: "The major impact of HIV/AIDS on small scale holders agriculture include serious depletion of human resources, diversion of capital from agriculture, loss of farm and non-farm income and other psychological impacts that affect agricultural productivity. Also according to Ajieh and Okoh, (2009), Women and men, young and old, people expected to plough the land, tend the crop harvest and store the produce are dying", these statements are true from the findings of the study. From this analysis it is quite clear that HIV/AIDS is a serious problem to crop yield.

**5.3 Reduced Labour**

From the findings of the study it's found that there is reduced labour among all the respondents (chronically ill households) interviewed due to the illness and death in their respective households. These confirms to FAO, (2011) that HIV/AIDS has enormous impact on agricultural labour. Many households appear to be experiencing reductions in labour quality and quantity as a direct result of HIV/AIDS pandemic. Productivity initially reduced when the HIV/AIDS infected person is ill, and later the supply of household labour declines even further with the death of that person. The major impact of HIV/AIDS on small scale holders agriculture include serious depletion of human resources, diversion of capital from agriculture, loss of farm and non-farm income and other psychological impacts that affect agricultural productivity. The number of person available in a household determine how much labour is available for the cultivation of crops and equally the category of household members will determines whether one can contribute to the household labour or not. The more the labour, the more land can be cultivated and enough crop yield will be produce and the higher the morbidity and mortality the higher the reduction in crop to be produced and less crop yield. This assertion is true of the result of the study because before the members infected with HIV/AIDS they produce 25 bags of millet and 30 bags of rice respectively. But after infected with HIV/AIDS, the crop yield per bags reduced to 7bags of millet and 9 bags of rice respectively. This show HIV/AIDS is a compounding factor to crop yield in the study area.

**5.4 Size of land cultivated before and after infected with HIV/AIDS**

From the findings of the study its shows that there is differential in size of farm land cultivated before infected with HIV/AIDS and after infected with HIV/AIDS. The study revealed that before infected with HIV/AIDS the various households interviewed cultivating 131.82 acres of land. However after being infected and affected with HIV/AIDS the farm cultivation size of the households interviewed drop to 41.85 acres of land as shown in table 7 of the result. It was about 86.82 % reduction compared with the previous area of land under cultivation. The study also found 6 household's members abandoned the cultivation of farm land. The findings show that crop production was reduced due to reduction in size of land in cultivation. This findings confirmed to Haslwimmer ( 1996) that crop production by small scale farmers declined seriously in many areas due to reduction in land use / or poor yield because money saved for farm inputs was diverted to medications or funerals. Rural people in most part of Africa have had to sell capital assets to fund care and funeral expenses, adult

labour has been loss from the system and the transition of agricultural knowledge between generations has been disrupted.

### 5.5 Differential vulnerability

The study further revealed that there is differential vulnerability in households of those who are not infected with HIV/AIDS and those infected with HIV/AIDS. For example The farm of those who are not infected with HIV/AIDS are well weeded that can retain soil moisture content while those infected with HIV/AIDS was not weeded and the crops are about to dry due to competition of the little moisture from the soil by weeds as rain fall was very little in the area. Also the study further gathered that there is differentials vulnerability among the HIV/AIDS people interviewed by comparing the type of house they live, the structure and how their farms look like when compared with non-infected households. .

### 5.6 Gender division of labour

The role of gender in livelihood generation cannot be over underscored. This is because men and women bear different responsibilities and have different option in household livelihood generation, (Ngutti, 2007). From the result of the study conducted, it's revealed that the women are not actively engaged in the core agricultural activities. They are mostly confining to household and left with reproductive role although they are allowed to do some minor activities to generate little income for the family. This has far reaching consequence for crop production and crop yield as women in most communities are the active producers of farm produce. Unfortunately from the findings of the study shows that the decision on what to do in the household, farm, income generation are all taken by the men and left the women's with reproductive role only. This finding contravene to the UN, (2001) which acknowledge that inequality and discrimination based on power imbalance between women and men in societies, both increase women's susceptibility to infection and places a disproportionate burden on them in coping with HIV/AIDS in families and communities.

### 5.7 Productive asset

From the result of the study conducted at Jabarmari village; it show 80 % of the respondents have sale their assets to buy drugs at the expense of farm inputs and feed for the families. This is confirm to the work of lovelife (2000), which stated that once a household member develops AIDS, increase medical and other costs, such as transport to and from health services, occur simultaneously with reduce capacity to work, creating a double economic burden. Furthermore as earlier mention Gobotswang.K. (2006) stated that when HIV/AIDS strike a household, they often trigger a chain of even that include disposing of livestock that is critical for drought power but also diminution of all valuable assets in the household.

This has far consequence to the AIDS infected household as in certain stage they lack resource to do the little farming for their family survival. This is true as shown in the figure 4B of the finding of the study that the infected household lack the resources to cultivate his cassava farm land as he exhausted all valuable resource on buying of drugs. Also curry, et al (2006) stated that when HIV/AIDS strike a household, there is significant impact of HIV/AIDS effect in the affected households than non-affected households due to HIV/AIDS illness and death which resulted in labour loss, income, high medical expenditure and less food for the household. Its went on to state further that because of the death of an adult in the household it had a mixed set of effects on Household assets; the most immediate impact on household assets is the shortage of labour experienced by households in which one or more members suffer from HIV/AIDS. All of these arguments are confirmed in this study.

### 5.8 Crop production

Maximum Crop yield depend on a number of factors such as the availability of soil nutrient, soil moisture, Labour for cultivation, light, sufficient farm inputs, free from droughts and protection of the plant from pest and disease attack. From the finding of the study shows

that; these requirements are lacking. The study reveals that there is shortage of labour due to illness and deaths in households, Insufficient supply of fertilizer and other farm inputs to the farmers by government, shortage of capitals, droughts, pest and diseases among others reduce crop yield in the study area. This confirmed to Study conducted by (IFAD, 2001) that in developing countries, the annual rate of crop yield for staples fell from 3% in 1970s to about 1% in 1990s. What does this means for crop production and livelihoods of the small scale farmers in Jabarmari particularly chronically ill household and infected people? Its means that rate of crop yield for (cereals and legumes) has fallen down. This decline in yield growth has a chain negative consequence not only to the infected and affected households but to the entire community as people run out of food supply which make them to migrate to others places in search of new livelihood. But what does this means for the AIDS infected person and his/her family, as they lack strength to do heavy labour work, their potential assets has already disposed and exhausted? The possible mechanism is to engage in risky livelihood which will make them susceptible to HIV and then AIDS for the household's members and further jeopardised the critical condition of the infected person households.

### 5.9 Crop yield

Crop diversity (variety) and yield depend on number of growing condition. Improve variety and early maturity crop; they may vary for example different in height, flower colour. They may also vary in less noticeable characteristic such as their response to cold, heat or drought or their ability to tolerate specific pest and disease. From the result of the study revealed that, there are number of high yield crops been introduce in to Borno state after taken in consideration the climatic condition of the state(drought, dessert encroachment, attacked by qualia birds and insect infestation). It was revealed during focus group discussion that drought resistance crops like hairy composite, warabashi, among others were introduced to increase and improve crop yield among small scale farmer in the state. Many people have adapted to the cultivation of improve varieties and quit huge success in the state particularly the southern part of the state. This statement is confirm to IITA (2009) report that many farmers who adopted the improve technologies and management practices experienced increase food availability and livelihood as well as considerable progress in addressing the problem of declining soil fertility and striga weed (IITA, 2009).however those chronically ill household find it difficult to comprehend due to cost of purchase the improve seeds and other inputs as money for the farm inputs and improve varies are invested in purchasing of drugs and other urgent medical threat.

### 5.10 Vulnerability Context

The general farming environment of the Borno state has a number of constrain that retard farming activities in the state. This include drought, biophysical condition, unsustainable land use, desert encroachment among others things. During data collection it was confirmed from the farmers that there are three major constrains were faced by the farmers. These include unpredictable periodic rain fall follow by long secession of dry season and poor soil of low fertility, conflict and secondly socio economic environment of the farmers which push the farming activities in to the boarder of poverty line. The situation becomes even worse with the rapid increase of HIV/AIDS among small scale farmers in the state. These identified constrains has really make the people vulnerable more particularly HIV/AIDs infected households. To this end assistance of government becomes very relevant as the typical small-scale farmer who had small land size for cultivation will plunge in poverty and misery.

## Chapter Six: Conclusion and recommendations

This chapter sheet light on conclusion and recommendation based on the result and analyses presented on the research.

### 6.1 Conclusions

From the result and discussion of the study presented the following conclusions were drawn based on assumption; that out of 25 chronically ill household interviewed, there are 239 household members. The average household size is maximum of 16 people per household and minimum of 6 people in each household. It's also show that there are more boys than girls in the study households.

Most literature on HIV/AIDS stated that the female are most infected with HIV/AIDS related sickness than the male. From the findings of this study shows that the male age 18 – 29 are more affected with AIDS related diseases than the female. Secondly the total number of deaths in the households surveyed is 43 people. 34 (25 male and 9 female) are young male and female below the age 0- 14, 9 between the age 15 – 49 While 4, 50yrs. and above. Most of the deaths are among young males than the female.

The study uncovers that 26 % chronically ill household have abandoned farming. The reason could be assumed as a coping strategy since cultivation of crop like millet, sorghum, rice demand high investment of money and energy. Secondly since the type of soil in the study area is mixture of clay/loamy soil, in most case need tractor hallowing which is beyond reached of AIDS affected person as money are invested in purchasing drugs for survival.

Due to religious, socio – cultural socialization and biology women's in the study area were more dominated by their opposite sex as most women were assign the roles of providing household hold care and maintenance; Such roles include cooking, care for the sick, fetching water, house clearing, petty business among others within the household. While the men are primarily responsible in providing economic support, control, decision making, task allocation and all energetic work within the household and wider contact with outside community member.

Study found that there are many fields left unutilized because the young adults are physically ill and unable to work on the farm, weeding, and other inter cultivation activities are neglected as a result of labour and inputs shortage thus resulting in reduction of crop yields.

In many studies it was reported that women tend to be the main producers of food while men appear to be managing most of the commercials crops although not without women's contribution; from this study the opposite is the case as men dominated every activities of the household and women were confine to households with little specialised job opportunity.

The study also identifies differential vulnerability in terms of farming difference, house to live between AIDS affected households and non AIDS affected households. The AIDS affected household could not able to cultivate sufficient land to produce sufficient crop yield due to HIV/AIDS related morbidity and death. It has been observed that most of their farms were not weeded due to shortage of resources (money), illness and death in their households. Furthermore it has been observed that the houses of AIDS affected person were constructed with corn stick and used leather bags as they cannot afford the resources to build it with clay, zinc and thatches while those of non-affected houses were built with block and zincs.

The study also discovered that there is high level of stigma and discrimination on HIV/AIDS towards infected and affected people in the community as many dies in silence without seeking medical treatment.

The study also discovered the community face constant droughts due desert encroachment. The area also witness low rainfall follow by long secession of dry season and poor soil of low fertility, and conflict.

### 6.2 Recommendations

Based on the conclusion of the study the following recommendations are proffered:

(1) The Borno state agricultural development programme is hereby call upon to provide special assistance on farming to all HIV/AIDS infected and affected people to enable them cultivate their farm.
(2) The ADP is also urged to come to the aid of those who have abandoned farming with food relief materials and create them some opportunity to stand on their own. Furthermore the ADP is urged to promote less labour intensive farming implement for HIV/AIDS infected and affected people as most farm implement seen are too heavy for them to work.
(3) There is urgent need on part of Jere local government to come to the aid of All HIV/AIDS infected and affected people and their families with financial and materials support for them to be able to cultivate their farm land
(4) The local government is urgently called upon to assist and build houses of chronically ill people (AIDS affected) people at Jabarmari village.
(5) A called for government to provide the community with subsidize sufficient agricultural farming inputs to boost their farming activities at the study area.
(6) Awareness campaign on HIV/AIDS should be provided to reduced stigma and discrimination against infected people.
(7) Government should appoint a professional agriculturalist to pilot the affairs of the ADP as against the current practice
(8) The research called and recommends for Jere local government to identifying AIDS affected people and support them with special packages both material and in kind to reduce their hardship.
(9) The study recommended for improvement of the status of women in the society particularly in decision making process as well as freeing them from houses confinement. This is relevant because gender inequality is acknowledged as an important determinant factor on the impact of HIV/AIDS.
(10) Finally further study is recommended in the study area on that involve both AIDS affected household members and non-AIDS affected household members to establish the impact of HIV/AIDS on crop production.

## 7.1 References


Avert, (2011) HIV and AIDS in Nigeria [online] available at http://www.avert.org/aids - nigeria.htm (accessed on 05/06/2011)

Barnett. T., (2001) HIV/AIDS impact studies [online] available at www.pdj.sagepub.com/ content/2/3/219.full.pdf

Beck. G.S, (1991) a treatise on the family, Enlarge, edition, Cambridge, UK London

BOSG,(2008) The history of Borno: geography, climate and population[online] available at Http://www.bornonigeria.com/index.php (accessed on 30/06/2011)

CDC, (2011) Basic information about HIV/AIDS available [online] at http://www.cdc.gov/hiv/topic/basic/ (accessed on 2/07/2011)

Conway, G., (1997) the doubly green revolution, London: penguin Books

CGIAR, (2011) Drought – tolerant crops for dry lands [online] available at www.cgiar.org/pdf/ drought_tolerant_crop_for_dryland.pdf (accessed on 02/09/2011)

Christopher. C, Monica, Charles, Williams, Gerald. S., (2009) measuring the impact of Malawi's farm input subsidy program [online] available at www.agecon.purdue.edu/academic/ (accessed on02/09/2011)

Pookpakdi. A.,(1989); sustainable agriculture for small scale farmers available [online] at http://www. Agnet.org/library/bc/44002 (accessed on03/07/2011

Cotthem. V. W., (2008) converting desert encroachment in Nigeria available [online] at http://desertification.wordpress.com/2008/02/23/combating-desert-encroatchment-in-nigeria (accessed on 30/06/2011)

FAO, (1991) sustainable agriculture for small scale farmers available [online] at http://www.agnet.org/library/bc/44002(accessed on 03/07/2011)

FAO, (2003) HIV/AIDS and agriculture available [online] at http://ftp.fao.org/sd/SDW/SDW/ip_summary_2003-webversion.pdf (accessed on 05/06/2011)

FAO, (2011) HIV turning in to development issue available [online] at http://www.fao.org/DOCREP/htm (accessed on 23/05/2011)

FAO, (2011) the economic impacts of HIV/AIDS [online] available at www.fao.org/wairdocs/ (accessed on 02/09/2011)

FMOH, (2010) technical report national sero – prevalence survey available [online] at http://www.nigeria-aids.org/document/2010_national/PDF (accessed on 28/05/2011)

IFAD, (2001) intermediate level handbook: socio-economic and gender analysis available [online] at http://www.fao.org/sd/seaga/downloads/En/FieldEn.pdf (accessed on 04/07/2011)

IFAD, (2001) rural poverty report 2001, the challenges of ending rural poverty, oxford: university press for IFAD

IITA, (2009) changes in household food security and poverty status in PROSAB area of southern Borno state, Nigeria available [online] at http://www.iita.org/c/document_library/get_file? (Accessed on 30/06/2011

Jere LGA, (2010) Demographic figure, Borno state printing press Maiduguri, Borno state

Journalists against aids Nigeria, (2010) national policy on HIV/AIDS available [online] at hhttp://www.nigeria-aids.org/content.cfm/3d (accessed on 10/03/2011)

Mohammed, A.S, (2011) Lake chad Basin initiative in support of STIs HIV/AIDS, BOSACA

National fadama project, (2011) state info available [online] at http://www.fadama.net/HTML/state_details.php? State=Borno (accessed on 30/06/2011)

Nigeria/Africa master web, (2006) Nigeria 2006 census figure available [online] at http://www.nigeriamasterweb.com/nigeria06censusfigs.html (accessed on28/05/2011)

Ngutti.N.F, (2007) Adoption of agricultural innovations by small scale farmers in the contect of HIV/AIDS, Wageningen University

Pathfinder international, (2011) responding to HIV/AIDS: Nigeria available [online] at http://www.pathfind.org/site/Docserver/PF.fact_sheet.HIV.nigeria.pdf (accessed on 05/06/2011)

Peterson.K. and Obileye O, (2002) access to drugs for HIV/AIDS and related opportunistic infection in Nigeria available [online] at http:// allafrica.com/healthafrica/cca/resources/view/pdf (accessed on 26/05/2011)

Russell, (2002) cited in Nguthi.N.F, (2007) Adoption of agricultural innovations by small scale farmers in the contect of HIV/AIDS, Wageningen University

Sheriff A, (2005) report on grassroots enlightment on the spread of HIV/AIDS available [online] at http://www.warda.cgiar.org/publications/swihaproc/four.pdf (accessed on 27/06/2011)

The free dictionary, (2011) AIDS available [online] at http//medical-dictionary.thefreedictionary.com/HIV+AIDS (accessed on 02/07/2011)

UN, (2000) what is gender available [online] at www.itu.int/gender/about/gender.html

UNAIDS, (2000) AIDS in Africa: country by country available [online] at http://www.nigeria-aids.org /pdf/AIDS_in_Africa.pdf (accessed on 30/06/2011)

UNAIDS, (2010) HIV/AIDS estimate 2009 available [online] at http://www.unaids.or/en/regionscountries/countries/nigeria (accessed on 27/05/2011)

UNDESA, (2011) impact on agriculture available [online] at http://www.un.org/esa/population/publication/AIDSimpact/8_webversion.pdf (accessed on 05/06/2011)

USAIDS, (2005) policy guidance: mitigating the development impact of HIV/AIDS available [online] at http://pdf.usaid.gov/pdf_docs/PDACF054.pdf (accessed on 06/06/2011)

WHO, (2009) Lost opportunities to compete CD4+ lymphocyte testing among patients who tested positive for HIV in south Africa available [online] www.who.int/bulletin/volume/88/9/09

World Bank, (2007) Global monitoring report: promoting gender equality and women's empowerment available [online] at http://siteresources.worldbank.org/INTGLOMONREP 2007/resources/FINAL-LO-RES.pdf (accessed on 05/07/2011)

World Bank, (2009) Gender in agriculture source book available [online] at http://siteresources.worldbank.org/INTGENAGRLIVSOUBOOK/resources/completebook.pdf (accessed on 05/07/2011)

## Appendixes

### 7.2 Appendix 1(Topic lists)

***Farmers' respondents (MHH)***

- *Family member in the household*
- *To confirm if there is chronically ill person in the household*
- *To confirm if any one died after becoming chronically ill*
- *If yes ask for their sex(male or female)*
- *Responsibility to look after the sick person in household*
- *The main sources of livelihoods in the households*
- *The impacts of HIV/AIDS:*
  - *On labour to cultivate farm land due to morbidity and mortality*
  - *On crop produce (millet, sorghum, rice, beans, groundnut, and okra). Which crops is cultivated by whom? And Decision on farm crop to produce*
  - *work for men and for women(whom is responsible for what in the HH)*
  - *Compare farm yields before and after infections(3years period)*
- *Size of land use to cultivated before and after getting infected with HIV/AIDS*
- *The coping strategies put in place to minimise the above*
- *Support received from extended families, Government and other organisation to help them minimise the impacts.*
- *Challenges that are faced in coping with the impacts of HIV/AIDs*

***Key informants (Extension agents, local government officials, and BOSADP officials)***

- *The impact of HIV/AIDS to small scale farmers in Jabarmari? Prove for differential impact on men and women*
- *The roles and supports of local government,BOSADP and Extension agents towards small scale farmers living with HIV/AIDS*

*Challenges faced by each respondents (E/A, org) in executing their responsibilities*

***Check list for Observation***

*Household headship*

*Family structure (size and composition*

*Condition of the sick person, women and children*

*Status of the household can be observed*

*Type of housing, material use*

*Type of farm implement, crop grown and status of the fields*

*Division of labour (task allocated to household members (care related task)*

*Thank you*

## Appendix 2

### 3.3 Informed Consent Form

You are invited to participate in a study on (……). The study hope to find out (……). You were selected as a possible participant in this study and you are selected through a random means among chronically household)

If you decide to participate, you will answer a set of question that will last for 60 minutes out of your valuable times for others important engagements please. The study will greatly assist towards chronically ill household (small scale farmers) by possible intervention of Government to ease the plight of the ill household based on the recommendation for intervention at the end of the study.

Any information that is obtained in connection with study and that can be identified with you will remain confidential and will be disclosed only with your permission to any person or agency. Your decision whether or not to participate will not prejudice your future relation with the (Borno state ADP), If you decide to participate, you are free to discontinue participation at any time without prejudice.

If you have any questions, please do not hesitate to contact us. If you have any additional questions later, please contact …… at ……

You will be offered a copy of this form to keep.

You are making a decision whether or not to participate. Your signature indicates that you have read the information provided above and have decided to participate.

You may withdraw at any time without penalty or loss of benefits to which you may be entitled after signing this form should you choose to discontinue participation in this study.

---

Signature Date

---

Signature of Parent/Legal Guardian (If necessary) date

---

Signature of Witness ……. signature of Investigator……..

## Appendix 3

### 4.4 Time schedule of the research

I began this study in May 2011. First, selection of topic, and developing it in to Mini research proposal which was presented to my coordinator and supervisor with in attendance of some members of the academics staff as well as colleagues from rural development and HIV/AIDS specialization. The reason for this presentation was to get suggestion and inputs for further improvement in to full thesis proposal. On 12/07/2011, I travelled home (Borno state, Nigeria) to collect field data. The field work took me two weeks to do the interview with 25 chronically ill household and focus group discussion. The first week I travel to the study area to acquaint myself with the villagers and also introduce myself to the ward head, extension agents, and officials of Jere farmers association. This category of people mention (ward head, extension agents and officials of the village agricultural association) had helped in identifying the chronically ill household. I introduced myself to chronically ill people (respondents) and arrange time convenience to them for the interview. In the second week, I deed first phase of interview for five days while focus group discussion and field visit for the remaining three days. I concluded the field trip on 1/08/2011.

Jere as the local government of the study area according to 2006 national census conducted by national population commission had a population of 209,107 people. Out of this population 107,714 were male and 101,393 were female. It is one of the agrarian local governments of Borno state with fertile land and river yasaram passed through it, making the local government one of the potential area for fishing and irrigation.

**Appendix 4**

**7.5 Determinants of crop yield**

| Determinants of crop yield ( Human Factor) | | | |
|---|---|---|---|
| Factors determine crop yield | Yield/Hectare | Drought impact | AIDS impact |
| Soil fertility | - Type of soil | Drought had an impact on crop yield. Example if the type of soil is sandy soil which is porous, couple with less rainfall pattern in the locality of the AIDS affected person, due to its less (sandy soil) moisture retentive capacity, crop production and crop yield will be reduced when compared with loamy soil which can retain soil moisture content in a drought area. | AIDS had no impact on Soil |
| | - Soil management | Poor management of soil had an impact on crop yield in a drought prune area as inability of the farmer to apply both modern and tradition management practice will further expose crop to drought severely thus reduced crop yield. | Shortage of labour to carry out soil management practice will have an impact on the crop yield as HIV infected person battle with morbidity problem |
| Rainfall | - Rainfall pattern | The rain fall pattern had an impact on crop yield. Higher Crop yield can be obtained in an intermediate raining pattern than heavy and light rain both make the crop stunt and dry respectively. | AIDS had no impact rain |
| Pest and disease | - Weather condition | Bad weather (sunny, dumpy) creates a room for pest and diseases to multiply it thus will have an impact on crop yields. | Bad weather had an impact on AIDS infected person. Due to poor weather condition, the opportunistic disease will further aggravate the AIDS infected person thus make them not to work on little gardening and other activities. This will also bring poor crop yield. |
| | - Management | AIDS had no impact | Due to morbidity the AID affected person cannot carry out required management practice to cultivate his or her farm land thus had an impact on crop yield. |

| | | | |
|---|---|---|---|
| Inputs | - Fertilizer | Use of appropriate fertilizer and its application, improve drought varieties and hired labour are essential in a drought prune area and it had an impact on crop yield. | Fertilizer, varieties, hired labour had an enormous impact on AIDS affected person crop yield as money for such activities are invested in buying drugs and transportation to clinics thus had an impact on crop yield. |
| | - Varieties | | |
| | - Hired labour | | |
| Crop practice | - Planting<br>- Sowing<br>- Weeding<br>- Management of pest & disease<br>- Harvesting | Lack of early planting and sowing, weeding, control of pest and diseases as well as harvesting crops at it appropriate time will have a negative impact to crop yield in drought prune area. | The AIDS affected people have no energy and strength to plant timely at all time, sowing, weeding, control of pest and disease. Secondly savings and asset were disposed and the money was all invested on drugs thus had an impact on crop yield. |
| Timing of cropping Practice | - Wet season cropping<br>- Dry season cropping | Improve varies can produce high crop yield in a drought prune than local verities. Lack of applying it result in reduction of crop yield. | AID affected person had no resources to buy improve crop varies for his farming as money is invested on drugs. The local performance on yield is low.it had an impact on the crop yield. |
| | **Technical and institutional factor that had impact on crop Yield** | | |
| Extension agent | - Training<br>- Message | Farmers are trained and knowledgeable people as they routinely practice farming cultivation but limited in modern technical knowledge on droughts thus had an impact on their crop yield. | Appropriate and timely training to farmers by extension agent on nutritional crops is important to improve AIDS affected person heath condition. However due to illness the AIDS affected person some time missed such training thus affect the technical knowledge toward the cultivation and thus reduced the crop yield. |
| Technical change in Agriculture | - Improve technology | Drought had no impact on technology | Some of the improved technologies for preserving perishable goods are essential and not at the reach of the farmer particularly AIDS affected person. Non-use of it had an impact on crop produce and future crop cropping. |

| | | | |
|---|---|---|---|
| | - Adaptation | Improved technology had no impact on drought | Due to its fragile health situation, AIDS affected person missed in adopting such new adaptation thus had an impact on his crop yield. |
| Physical infrastructure (Communication links, Electricity, Storage facilities, Transportation facilities, Roads), storage facilities, road infrastructure (road, rail way) , market infrastructure (market), market transport ( vehicle, motorcycle), grade standard ,(Market grades), market information were very essential in facilitating crop produce valuable market, But these were not been included in the study . | | | |

## Appendix 5

## 7.6 Household survey

| HHS | | Household size | | | | | ILLness | | | | | | | Death | | | | | | | Dependancy ratio | Cultivation of land | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Male | | Female | | Total | Male | | | Female | | | Total | Male | | | Female | | | Total | | Before | After | | | |
| | | <14 | 15 > | < 14 | > 15 | | 18-29yrs | 30 - 50 yrs | 50 yrs above | 18-29 yrs | 30 - 50 yrs | 50 yrs above | | 0 - 14 yrs | 15 - 49 yrs | 50 yrs above | 0 - 14 yrs | 15 - 49 yrs | 50 yrs above | | | Acres | Acres | Acres increased / reduced | % Acres increased / reduced | (5)Cult. Abandoned |
| 1 | 2003 | 3 | 1 | 3 | 3 | 10 | 1 | | | | | | 1 | 1 | | | | | | 1 | 150% | 5.12 | 2 | -3.12 | -60.9% | |
| 2 | 2000 | 4 | 2 | 1 | 1 | 8 | | 1 | | | | | 1 | 1 | | | | 1 | | 2 | 166.60% | 7.41 | 0 | -7.41 | -100.0% | 1 |
| 3 | 2006 | 1 | 1 | 3 | 2 | 7 | | 1 | | | | | 1 | 1 | | | 1 | | | 2 | 133.30% | 4.94 | 1 | -3.94 | -79.8% | |
| 4 | 2005 | 1 | 1 | 2 | 2 | 6 | 1 | | | | | | 1 | 1 | | | 1 | | | 2 | 100% | 6.17 | 1 | -5.17 | -83.8% | |
| 5 | 1999 | 6 | 2 | 2 | 3 | 13 | | | 1 | | | | 1 | 1 | | | | | | 1 | 160% | 12.35 | 0 | -12.35 | -100.0% | 1 |
| 6 | 2007 | 7 | 5 | 2 | 1 | 15 | | | | 1 | | | 1 | 1 | | | | | | 1 | 150% | 12.35 | 2 | -10.35 | -83.8% | |
| 7 | 2002 | 4 | 3 | 3 | 2 | 12 | | | | 1 | | | 1 | 1 | | | | | | 1 | 140% | 8.64 | 2 | -6.64 | -76.9% | |
| 8 | 2005 | 2 | 1 | 1 | 1 | 5 | 1 | | | | | | 1 | 1 | 1 | 1 | 1 | 1 | | 5 | 150% | 4.92 | 0.5 | -4.42 | -89.8% | |
| 9 | 2008 | 3 | 2 | 1 | 1 | 7 | | | | 1 | | | 1 | 1 | | | | | | 1 | 133.30% | 4.92 | 1 | -3.92 | -79.7% | |
| 10 | 2002 | 6 | 3 | 1 | 2 | 12 | | | | 1 | | | 1 | 2 | | | | | | 2 | 140% | 7.41 | 2 | -5.41 | -73.0% | |
| 11 | 2002 | 3 | 1 | 2 | 3 | 9 | 2 | | | | 1 | | 3 | | | | | | | 0 | 125% | 8.64 | 0 | -8.64 | -100.0% | 1 |
| 12 | 2007 | 2 | 1 | 2 | 4 | 9 | | | | | | | 0 | 3 | | | | | | 3 | 80% | 1.7 | 6.17 | 4.47 | 262.9% | |
| 13 | 2006 | 2 | 2 | 2 | 2 | 8 | 1 | | | | | | 1 | | | | 1 | | | 1 | 100% | 6.17 | 1.6 | -4.57 | -74.1% | |
| 14 | 2001 | 3 | 2 | 1 | 1 | 7 | | 1 | | | | | 1 | 1 | | | | 1 | | 2 | 133.30% | 3.7 | 0.5 | -3.2 | -86.5% | |
| 15 | 2007 | 1 | 1 | 2 | 4 | 8 | | | | | | | 0 | | 1 | | 1 | | | 2 | 60% | 1.5 | 7.41 | 5.91 | 394.0% | |
| 16 | 2004 | 7 | 4 | 2 | 3 | 16 | 2 | | | | | | 2 | | | | | | | 0 | 128% | 7.41 | 2 | -5.41 | -73.0% | |
| 17 | 2008 | 1 | 2 | 3 | 4 | 10 | | 1 | | | | | 1 | 1 | | | 1 | | | 2 | 66.60% | 1.5 | 6.17 | 4.67 | 311.3% | |
| 18 | 2004 | 2 | 1 | 2 | 2 | 7 | 1 | | | | | | 1 | | | | 1 | | | 1 | 133.30% | 4.94 | 1 | -3.94 | -79.8% | |
| 19 | 2002 | 2 | 2 | 3 | 2 | 9 | | | 1 | | | | 1 | 1 | | | 1 | | | 2 | 125% | 6.16 | 1 | -5.16 | -83.8% | |
| 20 | 2009 | 3 | 3 | 2 | 1 | 9 | 1 | | | | | | 1 | | 1 | | | | | 1 | 125% | 6.17 | 1 | -5.17 | -83.8% | |
| 21 | 1999 | 5 | 2 | 2 | 1 | 10 | | | 1 | | | | 1 | 2 | | | | | | 2 | 233.30% | 4.94 | 0 | -4.94 | -100.0% | 1 |
| 22 | 2001 | 2 | 1 | 4 | 4 | 11 | | | | | | 1 | 1 | 2 | 1 | | 1 | | | 4 | 120% | 7.41 | 1.5 | -5.91 | -79.8% | |
| 23 | 1998 | 3 | 2 | 2 | 1 | 8 | 1 | | | | | | 1 | 1 | | | | | | 1 | 166.60% | 4.94 | 0 | -4.94 | -100.0% | 1 |
| 24 | 2003 | 2 | 1 | 3 | 2 | 8 | | | | | | | 0 | 2 | | | | | 1 | 3 | 166.60% | 8.64 | 2 | -6.64 | -76.9% | |
| 25 | 2001 | 6 | 3 | 3 | 3 | 15 | | 1 | | | | | 1 | 1 | | | | | | 1 | 150% | 7.41 | 0 | -7.41 | -100.0% | 1 |
| Total | | 81 | 49 | 54 | 55 | 239 | 11 | 5 | 3 | 4 | 1 | 1 | 25 | 25 | 4 | 1 | 9 | 3 | 1 | 43 | | 131.82 | 41.85 | -113.61 | -86.2% | 6 |
| Cum Total | | 130 | | 109 | | | 11+5+3=19 | | | 4+1+1= 6 | | | | 25 + 4 +1 = 30 | | | 9 + 3 + 1 = 13 | | | | | | | | | |
| | | 130 +109 = 239 | | | | | 19+6=25 | | | | | | | 30 + 13 = 43 | | | (1) HHS - Household | (2) Yr - ye | (3) HHS Abandoned Farming | | | 3 | (4) Crop increased | 4 | (5) Cult - Cultivation | |

**Keys to the tables**

(1) Cum --- Cumulative (2) Yrs.-years (3) HHS--- Households (4) <I Less than I> Greater than

## Appendix 6

## Crop production reduced

| ILLness | | | | | | Total | Death | | | | | | Total | Cultivation of land | | | | crop yield | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Male | | | Female | | | | Male | | | Female | | | | Before | After | | | (5)Cult. Abandoned | Crop yield cultivated Before | | | | Crop yield cultivated After | | | | | | |
| 18-29yrs | 30 - 50 yrs | 50 yrs above | 18-29 yrs | 30 - 50 yrs | 50 yrs above | | 0 - 14 yrs | 15 - 49 yrs | 50 yrs above | 0 - 14 yrs | 15 - 49 yrs | 50 yrs above | | Acres | Acres | Acres increased / reduced | % Acres increased / reduced | | Millet | Rice | sourghum | legumes | Millet | Rice | sorghum | legumes | increased / reduced yield | % |
| 1 | | | | | | 1 | 1 | | | | | | 1 | 5.12 | 2 | -3.12 | -60.9% | | 6955.0 | 0.0 | 0.0 | 0.0 | 2716.8 | 0.0 | 0.0 | 0.0 | -4238.2 | -60.94% |
| | 1 | | | | | 1 | 1 | | | | 1 | | 2 | 7.41 | 0 | -7.41 | -100.0% | 1 | 7230.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -7230.0 | -100.00% |
| | 1 | | | | | 1 | 1 | | | 1 | | | 2 | 4.94 | 1 | -3.94 | -79.8% | | 0.0 | 4368.0 | 0.0 | 0.0 | 0.0 | 884.2 | 0.0 | 0.0 | -3483.8 | -79.76% |
| 1 | | | | | | 1 | 1 | | | 1 | | | 2 | 6.17 | 1 | -5.17 | -83.8% | | 0.0 | 5460.0 | 0.0 | 0.0 | 0.0 | 884.9 | 0.0 | 0.0 | -4575.1 | -83.79% |
| | | 1 | | | | 1 | 1 | | | | | | 1 | 12.35 | 0 | -12.35 | -100.0% | 1 | 10920.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -10920.0 | -100.00% |
| | | | 1 | | | 1 | 1 | | | | | | 1 | 12.35 | 2 | -10.35 | -83.8% | | 0.0 | 10920.0 | 0.0 | 0.0 | 0.0 | 1768.4 | 0.0 | 0.0 | -9151.6 | -83.81% |
| | | | 1 | | | 1 | 1 | | | | | | 1 | 8.64 | 2 | -6.64 | -76.9% | | 0.0 | 7644.0 | 0.0 | 0.0 | 0.0 | 1769.4 | 0.0 | 0.0 | -5874.6 | -76.85% |
| 1 | | | | | | 1 | 1 | 1 | 1 | 1 | 1 | | 5 | 4.92 | 0.5 | -4.42 | -89.8% | | 0.0 | 0.0 | 0.0 | 3434.0 | 0.0 | 0.0 | 0.0 | 349.0 | -3085.0 | -89.84% |
| | | | 1 | | | 1 | 1 | | | | | | 1 | 4.92 | 1 | -3.92 | -79.7% | | 0.0 | 4368.0 | 0.0 | 0.0 | 0.0 | 887.8 | 0.0 | 0.0 | -3480.2 | -392.00% |
| | | | 1 | | | 1 | 2 | | | | | | 2 | 7.41 | 2 | -5.41 | -73.0% | | 0.0 | 0.0 | 4242.0 | 0.0 | 0.0 | 0.0 | 1144.9 | 0.0 | -3097.1 | -73.01% |
| 2 | | | | | 1 | 3 | | | | | | | 0 | 8.64 | 0 | -8.64 | -100.0% | 1 | 0.0 | 0.0 | 0.0 | 7644.0 | 0.0 | 0.0 | | 0.0 | -7644.0 | -100.00% |
| | | | | | | 0 | 3 | | | | | | 3 | 1.7 | 6.17 | 4.47 | 262.9% | | 0.0 | 0.0 | 3420.0 | 0.0 | 0.0 | 0.0 | 12412.6 | 0.0 | 8992.6 | 262.94% |
| 1 | | | | | | 1 | | | | 1 | | | 1 | 6.17 | 1.6 | -4.57 | -74.1% | | 5460.0 | 0.0 | 0.0 | 0.0 | 1415.9 | 0.0 | 0.0 | 0.0 | -4044.1 | -74.07% |
| | 1 | | | | | 1 | 1 | | | | 1 | | 2 | 3.7 | 0.5 | -3.2 | -86.5% | | 0.0 | 0.0 | 3001.0 | 0.0 | 0.0 | 405.5 | 0.0 | 0.0 | -2595.5 | -86.49% |
| | | | | | | 0 | | 1 | | 1 | | | 2 | 1.5 | 7.41 | 5.91 | 394.0% | | 0.0 | 3500.0 | 0.0 | 0.0 | 0.0 | 17290.0 | 0.0 | 0.0 | 13790.0 | 394.00% |
| 2 | | | | | | 2 | | | | | | | 0 | 7.41 | 2 | -5.41 | -73.0% | | 0.0 | 0.0 | 0.0 | 4242.0 | 0.0 | 0.0 | 0.0 | 1144.9 | -3097.1 | -73.01% |
| | 1 | | | | | 1 | 1 | | | 1 | | | 2 | 1.5 | 6.17 | 4.67 | 311.3% | | 0.0 | 0.0 | 3001.0 | 0.0 | 0.0 | 0.0 | 12344.1 | 0.0 | 9343.1 | 311.33% |
| 1 | | | | | | 1 | | | | 1 | | | 1 | 4.94 | 1 | -3.94 | -79.8% | | 0.0 | 0.0 | 0.0 | 4660.0 | 0.0 | 0.0 | 0.0 | 943.3 | -3716.7 | -79.76% |
| | | 1 | | | | 1 | 1 | | | 1 | | | 2 | 6.16 | 1 | -5.16 | -83.8% | | 5440.0 | 0.0 | 0.0 | 0.0 | 883.1 | 0.0 | 0.0 | 0.0 | -4556.9 | -83.77% |
| 1 | | | | | | 1 | | 1 | | | | | 1 | 6.17 | 1 | -5.17 | -83.8% | | 0.0 | 5435.0 | 0.0 | 0.0 | 0.0 | 880.9 | 0.0 | 0.0 | -4554.1 | -83.79% |
| | | 1 | | | | 1 | 2 | | | | | | 2 | 4.94 | 0 | -4.94 | -100.0% | 1 | 5460.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -5460.0 | -100.00% |
| | | | | | 1 | 1 | 2 | 1 | | 1 | | | 4 | 7.41 | 1.5 | -5.91 | -79.8% | | 10920.0 | 0.0 | 0.0 | 0.0 | 2210.5 | 0.0 | 0.0 | 0.0 | -8709.5 | -79.76% |
| 1 | | | | | | 1 | 1 | | | | | | 1 | 4.94 | 0 | -4.94 | -100.0% | 1 | 0.0 | 0.0 | 5460.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -5460.0 | -100.00% |
| | | | | | | 0 | 2 | | | | | 1 | 3 | 8.64 | 2 | -6.64 | -76.9% | | 76440.0 | 0.0 | 0.0 | 0.0 | 17694.4 | 0.0 | 0.0 | 0.0 | -58745.6 | -76.85% |
| | 1 | | | | | 1 | 1 | | | | | | 1 | 7.41 | 0 | -7.41 | -100.0% | 1 | 0.0 | 0.0 | 0.0 | 10920.0 | 0.0 | 0.0 | 0.0 | 0.0 | -10920.0 | -100.00% |
| 11 | 5 | 3 | 4 | 1 | 1 | 25 | 25 | 4 | 1 | 9 | 3 | 1 | 43 | 131.82 | 41.85 | -113.61 | -86.2% | 6 | 128825.0 | 41695.0 | 19124.0 | 30900.0 | 24920.8 | 24771.2 | 25901.6 | 2437.2 | -142513.1 | |
| **11+5+3=19** | | | **4+1+1= 6** | | | | 25 + 4 +1 = 30 | | | 9 + 3 + 1 = 13 | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **19+6=25** | | | | | | | **30 + 1** | | | (1) HHS - Housel | | | (2) Yr - y | (3) HHS Abandor | | 3 | (4) Crop increased | 4 | (5) Cult - Cultivation abad | | | | | | | | | |