THE SOCIO ECONOMIC EFFECTS OF CONSERVATION FARMING IN DROUGHT MITIGATION: A CASE STUDY OF MPIMA WOMEN IN KABWE, ZAMBIA

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Abstract

Key words*: drought, conservation farming, socio economic effects, adoption rates, mitigation, potholing, ripping, crop diversification and weeding.*

Drought has been known to have an adverse impact on households. Southern Africa with Zambia included has experienced cyclical rainfall which has affected yields over the years. Communities have opted for diversified farming practices in order to mitigate the effects of drought. Conservation farming is viewed as one of the ways to mitigate the effects of drought.

The Mpima women of Kabwe, in Central province of Zambia were also affected by the 2003-2005 droughts. Since the community depends solely on farming for livelihood and food security the effects of drought compromised their livelihoods. The women face a double tragedy as they are charged with looking after orphans whose parents have died as a result of AIDS related illnesses. Africare, an International organization introduced conservation farming methods to the women as a way of alleviating their problems. The study focuses on the socio economic effects of conservation farming in drought mitigation. Adoption rates of conservation farming as well as the support provided by Africare are also explored. The findings show that conservation farming has increased income and food security for some women and not others. This may be attributed to the different adoption rates and the women's differentiated ability to work in the fields.

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All things are possible for those who believe.

List of Acronyms

AIDS	Acquired Immune Deficiency Syndrome
CABSCORM	Capacity and Sustainability of Community Responses to Orphans and Vulnerable Children in Mpima
CF	Conservation Farming
CFS	Crop Forecast Surveys
CFU	Conservation Farming Unit
DMMU	Disaster and Mitigation Management Unit
ENSO	El Nino/Southern Oscillations
FAO	Food and Agriculture Organisation
FGD	Focus Group Discussion
GART	Golden Valley Agriculture Research Trust
HIV	Human Immunodeficiency Virus
IESR	Institute of Economic and Social Research
IFPRI	International Food Policy Research Institute
IGA	Income Generating Activity
ITCZ	Inter Tropical Convergence Zone
MACO	Ministry of Agriculture and Cooperatives
NGOs	Non-governmental Organisation
OVC	Orphans and Vulnerable Children
VAC	Vulnerability Assessment Committee

ZDHS	Zambia Demographic Health Survey
ZNFU	Zambia National Farmers Unit
ZVAC	Zambia Vulnerability Assessment Committee

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CHAPTER ONE

1.0 Introduction

This research focuses on socio-economic effects of Conservation Farming in Drought Mitigation. The key theme of the study is conservation farming and how it has been used as a drought mitigation strategy. The particular study was conducted in Kabwe district in the Central province of Zambia. This district like many has been affected by drought. In this particular study emphasis is on the effects of drought in Zambia in relation to the Mpima women in Kabwe district.

The structure of the dissertation starts with an introductory chapter followed by literature review, methodology, research findings and analysis. The last two chapters focus on conclusions and recommendations.

1.1 Background of the study

Zambia's estimated population is 11.8 million and growing (United States Census Bureau, International Data Base, 2009). The landlocked country has nine provinces and disparities between them are huge. As a third world country, it is characterized by high poverty levels. Cultural practices that perpetuate gender imbalances have resulted in women being worse off financially than men. Urban areas have more access to social and health facilities while the rural population are impoverished and walk long distances to access the same services and markets.

Most regions of Zambia are affected by cyclical droughts that have impacted food production which is exclusively dependant on rain-fed staple crops. Rainfall is concentrated over the five-month period from November to March and varies from 700mm in the south to 1 500mm in the north. During the summer rainfall, October to April, the El Nino/Southern Oscillations (ENSO) phenomenon is now being recognized as the other major factor in determining precipitation patterns in Zambia. ENSO affects Inter-tropical Convergence Zone (ITCZ) the main rain bearing mechanism (National Agriculture Policy, 2004).

According to Muchinda (1999:1-5), drought can be described as a temporary reduction in water or moisture availability to significantly below the normal or expected amount for a specified period. There are four types of drought namely, meteorological, hydrological, agricultural and famine drought. In drier areas a small reduction of rainfall has significant economic effects. This is because;

a) Low mean annual rainfall is associated with extremely variable precipitation
b) The duration of drought is greater in drier lands.

Drought can also occur in areas that normally have abundant rainfall. Drought does not only relate to rainfall amounts but fluctuations in water demand. In addition, Whitmore (2000) states that drought affects all sectors in different ways from sector to sector. A dry spell may affect a grain crop while improving the ripening of a fruit.

Drought poses risks such as food insecurity, lack of access to water, malnutrition, lack of education especially for the girl child and diseases due to poor nutrition and untreated water. In times of poverty and scarce resources girls tend to be removed from school compared to boys. They would be the ones that carryout house chores, looking after the sick as well as getting married to bring some wealth into the family. All these are a result of reduced livelihood options for the household. The United Nations Development Programme (UNDP) paper on drought underscore the point that drought is a major determinant for food insecurity but this is felt more when the prices of food are high due to scarcity (UNDP Paper, UNDP Zambia retrieved from UNDP.org.zm on. The paper adds that rural populations who are mostly dependent on farm work such as food production, processing, marketing and transportation suffer when production is low due to drought. Drought can be addressed by putting mitigation factors in place. UNDP identified two societies namely: drought resilient society and drought vulnerable society. The first one has a drought policy in place, preparedness and early warning signs. The opposite is true for the latter.

In Southern Africa excessive rain in 2001 and dry spells during the 2001/02 growing season led to a major shortfall in maize production, a decrease of 42% compared with the average yearly production. Hume et al (2001) predicts reduced precipitation in Southern Africa in the next 100 years. This will also affect Zambia whose economy is agriculture based conversely, removal of vegetation cover through fires or overgrazing increases the risk of soil erosion during heavy downpours. This, too, leads to decreased agricultural productivity. In Zambia charcoal is the main source of fuel which leads to serious deforestation.

1.1.1 Agriculture in Zambia

Agriculture is an important sector in Zambia since the decline in the mineral sector. According to CEEPA (2006), agriculture accounts for 18-20% of the Gross Domestic Product in Zambia. It also provides livelihoods for more than 60% of the population. Two-thirds of Zambia's labour force is employed in the agriculture sector. Zambia has nine million hectare of land, 12% of the land is currently used for cultivation.

Zambia is divided into three major agro-ecological regions, namely regions I, II and III. According to the Zambia National Agriculture Policy 2004-2015, these regions have different rainfall patterns and soil respectively.

Figure 1 below illustrates the three agro-ecological regions of Zambia and Kabwe, the site of the study, falls under the green color code.

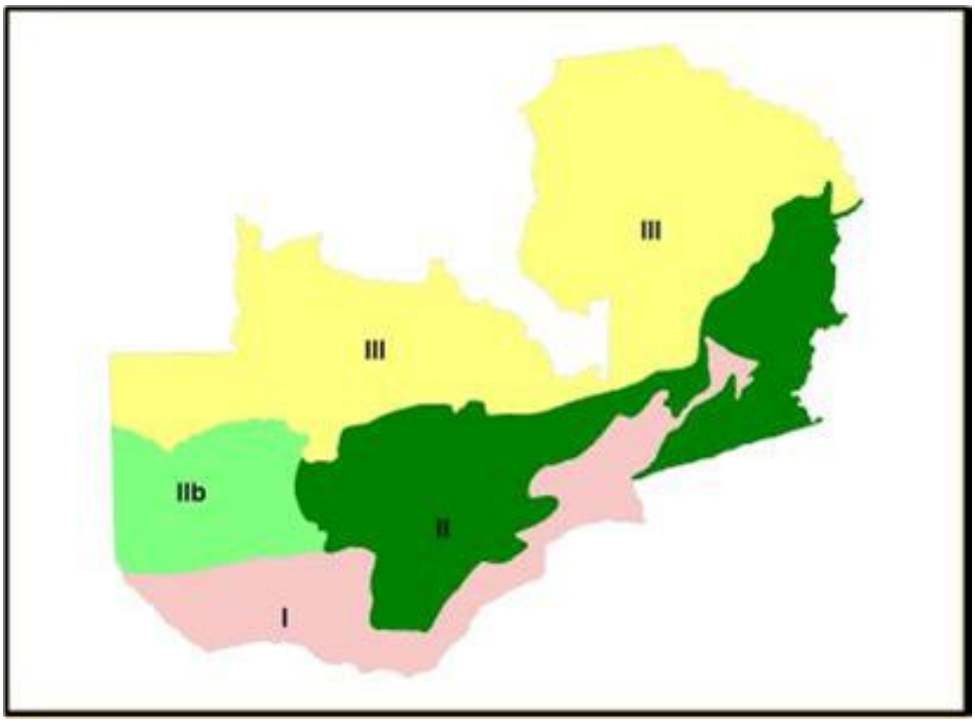

Figure 1: Agro-ecological regions of Zambia

Source: Zulu, *et al*., (2000)

Region I lies in the western and southern part of the country and accounts for about 15% of the land area. It receives less than 800mm of rain annually. It used to be considered the bread basket of the nation but for the last 20 years it has been experiencing low, unpredictable and poorly distributed rainfall. The observed meteorological data suggest that it is currently the driest region very prone to drought and with limited potential for crop production.

Region II covers the central part of the country, extending from the east through to the west. It is the most populous region, with over four million inhabitants, and has the highest agricultural potential. The soils here are relatively fertile. It receives about 800–1000mm of rainfall annually, which is evenly distributed throughout the crop growing season.

Region III spans the northern part of the country and has a population of over 3.5 million. It receives over 1000mm of rainfall annually. The high rainfall in this region has resulted in the soils becoming leached. It is suitable for late maturing varieties of crop. About 65% of the region in this region has yet to be exploited.

Zambia has a National Agriculture Policy that was developed in August 2004. Generally, conventional agriculture is practiced using ox drawn tillage and tractors. Since 1990 crop production has been affected due to sporadic rainfall. Since 1992 the Zambia government has made concerted efforts to liberalize the agricultural sector (National Agriculture Policy, 2004).

1.1.2 Conservation Farming in Zambia

The scarcity of rain is affecting agriculture production and increasing food insecurity. Alternatives ways of farming and the use of different seed varieties to curb the effects of drought are being promoted in Zambia. The Zambia National Farmers Union (ZNFU) set up, The Conservation Farming Unit (CFU) and the Golden Valley Agricultural Research Trust (GART) to promote alternative farming methods namely conservation farming. After the units were established a Zimbabwean consultant was brought in to assist with the establishment of the low tillage farm trials to be further promoted by the units. The notion of six to eight ton maize yields under hand hoe cultivation inspired the use of the hand hoe method under the Conservation Farming Unit in late 1995. The first trials were conducted in central and Southern provinces of Zambia. 800 to 1000 trials have been conducted annually between 1996 and 2001 (Haggblade and Tembo, 2003).

Studies conducted by Haggblade and Tembo (2003) confirmed that conservation farming increases yields by 60% for both maize and cotton growers. The practice of early preparation of basins in the dry season makes them able to plant during the first rains before conventional farmers start preparing the land. Although the emphasis for conservation farming is on low use of fertiliser, Conservation Farmers like Conventional Farmers use High Yield Variety (HYV) seeds and fertilisers which may be challenging in attributing the yields to conservation farming practises only. However it has been noted that despite this phenomenon, Conservation Farming (CF) still accounts for 700kgs per hectare compared to 300 – 400 kg due to the use of fertilisers. Conservation farming preparation has high labour costs compared to the conventional farmers who use ploughs. The CF weeding and use of herbicides cuts the labour from 79% to 15% which results in boosting the returns in the peak season by 50%.

1.2 Statement of the problem

The study focuses on the plight of women in Mpima in relation to the effects of drought on agriculture. These women decided to take charge of their lives and fellow villagers. Mpima like most communities is affected by the impact of HIV and AIDS. Most women are widowed and children have lost one or both parents. The loss of bread winners has led to an increase in food insecurity. Since the Mpima community depends on farming to sustain their livelihoods, the effects of drought have robbed the women of their only source of livelihood. Most of the women's crops were destroyed. Africare, a

development International organization, introduced the community to conservation farming as an alternative way of improving their food security as well as socio-economic status. The study seeks to understand whether conservation farming does change the socio-economic status of communities in times of drought.

1.3 Research Objectives

1.3.1 Overall Objective

To assess the effectiveness of conservation farming methods used by women in Mpima as a drought mitigation measure.

1.3.2 Sub objectives

The sub objectives of the study are as follows:

i) to establish the acceptance and importance of conservation farming in Mpima by the women;
ii) to assess the socio economic effects of conservation farming on the community;
iii) to establish challenges that affect women involvement in agriculture and
iv) To make recommendations to international non-governmental organizations and government departments for improvement

1.4 Rationale

This study was concerned with socio –economic effects of conservation farming in drought mitigation. This is an important study, as it gives an insight on the acceptance of conservation farming methods within the study area. It further establishes the importance of the conservation farming method. Above all the study assesses the socio-economic effects of conservation farming on the community as well as challenges affecting Mpima women. Therefore this study helps the government and other Non-Governmental Organizations as they embark on drought mitigation measures in Zambia. The highlighted problems faced by women coupled with the recommendations on these problems will help Africare, other NGOs and the government to plan for ways of addressing problems hindering women from succeeding in agriculture.

The study also adds to the literature available on the socio-economic effects of conservation farming in drought mitigation. Eventually the knowledge based on the programmes carried out by Africare in Mpima area would be of use to all stakeholders involved in the planning and implementation of conservation farming agricultural projects, with special interest to women both at present and in future.

CHAPTER TWO

2.0 Literature Review

2.1 Introduction

Chapter two focuses on the literature review covering definitions of concepts, exploring conservation farming from an international and regional perspective. The socio economic effects of drought and how conservation farming can mitigate them are further explained. The Zambia National Agriculture policy of 2004-2015 will also be discussed.

2.2 Definitions

2.2.1 Drought

Drought can be described as a temporary reduction in water or moisture availability to significantly below the normal or expected amount for a specified period. There are four types drought namely, meteorological, hydrological, agricultural and famine drought. According to Muchinda (1999) meteorological drought is a continuous period over a wide area during which the rainfall is below average. Meteorological drought if prolonged results in hydrological drought resulting in a marked decrease in water surface levels that dry up reservoirs, lakes, streams and rivers. This results in shortages of water for electricity, industry and agriculture (Muchinda, 1999). In 'agriculture drought' the impact depends on the timing, magnitude, duration and frequency of rainfall shortages and the response of the plants and soil (Whitmore, 2000). Drought can also occur in areas that normally have abundant rainfall. Drought does not only relate to rainfall amounts but fluctuations in water demand. Whitmore (2000) adds that drought affects all sectors in different ways from sector to sector. A dry spell may affect a grain crop while improving the ripening of a fruit. Therefore drought does not have a single definition. Cannon (2004) terms the socio economic drought a 'policy famine' which is an artificial famine during drought that is caused by poor planning

2.2.2 Conservation farming

According to the Conservation Farming Unit Handbook (2003), conservation farming is described as a farming methodology that does not employ widespread tillage. The preparation occurs earlier hence captures moisture from the previous rain. Early preparation soon after harvest is easier as the soils are still moist. Conservation farming maximizes residue and water retention by restricting tillage only where the crop will be planted. The system is called 'pot holing'. Crops are rotated in the same holes every year without adding manure or fertilizer. Different crop types are early maturing, nitrogen fixing and legumes that occupy 30% of the cropped land. Bwalya, M (1999) adds that conservation farming

embraces all the minimum tillage practises and goes further to cover socio-cultural and traditional practices and decision on sustaining eh physical and chemical fertility of the soil.

2.2.3. Mitigation

Mitigation is ensuring that the impact of the disaster and hazard on the community is reduced by putting in place preventive measures. Disasters provide an opportunity to strengthen both the preventions and response efforts. Drought mitigation entails putting plans in place that will ensure that the community survives the adverse effects of drought. Government policies can affect the impact of drought both negatively and positively (UNDP-DCC/BCPR drought discussion paper, 2005). Countries need to have policies on drought mitigation that take into consideration the resilience of the communities at hand and not food security and the socio economic system in isolation.

2.2.4. Socio economic

Socio economic refers to the development of communities that goes beyond access to finances. Cannon (2004) terms the socio economic drought a 'policy famine' which is an artificial famine during drought that is caused by poor planning.

2.3 Adoption

Adoption is the acceptance of new technologies and utilization in part or whole. According to Haggblade and Tembo (2003) adoption for cotton farmers in Zambia represents a clear choice based on the farmer's best assessment of what tillage system is in his or her best interest. In conservation farming adoption has been studied by several scholars. Nell (1998) categorizes adopters as follows:

- Full adopters – farmers using technology at recommended level
- Over adopters - farmers using beyond the recommended level
- Partial adopters - using less than recommended
- Wrong adopter – wrong use of technology
- Non adopters – non use of the recommended technology

Roger (1983) also identified five stages in a typical technology adoption decision process. These are:

- Innovators: these are mostly respectable local opinion leaders
- Early adopters: first few eager people in the population
- Early majority: deliberate and willing followers
- Late majority: need peer pressure to influence them to adopt
- Laggards: skeptical about the new and cling to the past

The above stages have been criticized for placing people into fixed categories implying that the processes are static. In reality populations are dynamic and change their minds as situations change. Awareness and training that involves farmers precedes any adoption process. Jabbar et al (1998)

states that, ‘the process in which information gathering, learning and experience play a pivotal role especially in the early stages of adoption’. Technology adoption increases with regular training and skills transfer. Studies in Ethiopia showed that adoption is not a one off event but a process that begins with learning – adoption- continuous or discontinuous use of technology. The author also coined a process called “diffusion and adoption”. Diffusion commences when an innovation is ready for use and is at the stage when explanation of the new technology is provided to the early users. Early users are called innovators who diffuse the information by explaining to the rest of the population. The notion that level of education influences adoption of certain technologies does not seem to have a strong correlation. Bentley (1987) shows that population with less education but skills in farming increased adoption in new technologies.

Stoneman (1993) uses socio economic characteristics to analyse the behavior of ‘adopters’ and ‘non adopters’. He uses the consumer demand theory that purports that consumer perception of the product affects their demand for it. In addition to demand, ability to afford the technology influences adoption. Neil (1998) quotes (Sanders et al 1996) who states that women are more likely to adopt new farming technologies as they play a huge role in farming in Africa. Women are involved in agriculture farming and most men in livestock. Entrepreneurial individuals will seek credit and information and adapt to new technologies as long as they perceive them as increasing their income. De Waal and Whiteside (2003) states that HIV affected families tend to adopt less productive and resilient farming practices due to reduction in labour force resulting from HIV illnesses.

2.3.1. Adoption of Conservation farming

Kabwe and Donovan (2003) state that the decision to adopt technology is usually guided by the information received from different sources as well as their own analysis of the technology. Availability of human and financial resources is also a determinant. Adopters who have been affected by a drought or experience erratic rainfalls patterns are more likely to accept conservation farming methods. Haggblade and Tembo (2003) states that Dunavant cotton farmers who were affected by drought recorded marked increases in adoption to water conserving technologies between 2000/1 and 2002/3 of 70% with the highest in Central province.

Haggblade and Tembo (2003) adds that technology that comes with incentives is more likely to be adopted more than the one without. Haggblade and Tembo (2003) and Stoneman (1993) also state that communities that have money to buy certain technologies will adopt more. For example adoption of the use of animal traction in ripping will mostly be for those that can afford cattle unless oxen can be attained on hire. Extension demonstrations also contribute to the high sustained adoption rates.

‘Conservation farming requires careful advance planning and meticulous, timely execution of key tasks’ (Haggblade and Tembo, 2003:15). The statement demonstrates that personal characteristics contribute to high adoption. In Zambia anecdotal interviews reveal that retired teachers, draftsmen and accountants made good conservation farmers. These people are usually hard working and were required to plan in their previous jobs.

Haggblade and Tembo (2003) state that adoption rates in conservation farming have been characterized by different circumstances.

- The drop in incentives for conventional agriculture has led to farmers diversifying into conservation farming
- Droughts have also led to the increase in adoption of conservation farming. A woman in Chongwe quoted from (IRIN, October 17, 2002) ‘conservation farming is a farming method for people who do not want to starve’
- Adoption is incremental and does not happen all at once. In Zambia conservation farming was applied in some plots and not all and it was evident that more women adopted than men.
- Access to credit influences some farmers to adopt. Venter et al (1993) adds that access to credit is required more for subsistence than commercial farmers.
- Geographical location according to the agro-ecological region also affects adoption rates.

2.4 Impact of drought in Zambia

Zambia has 75%`arable land and 60% of its population lives in the rural areas and depend on agriculture as their source of livelihood. The major crop is rain fed maize which is a staple food. Other crops are millet, sorghum, cassava and rice. Zambia has been experiencing different levels of drought since 1991 affecting food production. The VAC assessment of March 2005 showed that most of the districts experienced poor rainfall for the larger part of the current agriculture season. This will result in most households becoming food insecure. Although the Ministry of Agriculture and the Central

Statistics Office conduct crop forecast surveys (CFS) aimed at determining the expected production and food deficit, these surveys do not provide information on how drought affects the households and their livelihoods. Hence the Disaster Management and Mitigation Unit coordinates the vulnerability Assessments and these are meant to bring different partners together to extensively analyse the impact of impact of drought on people’s livelihood and recommend short term and long term mitigation strategies. Bwalya, M (1999) states that in the last fifteen years, three out of every five years have been drought years.

Factors to be taken into account are the risks such as;

- Food Supply and Access
- Livestock situation
- Water
- Nutrition
- HIV/AIDS
- Livelihoods

2.4.1 Food Security and access

Loss of adequate water to produce crop results in a deficit in the food that the family can eat. According to Muchinda (1999) Zambia's staple food mainly in the 1980s crop cultivation was at its peak as a result of seed and fertilizer subsidies. This production accounted for 70% of the total area that had crop. The subsidies led to illegal exportation of maize to neighbouring countries that had high prices of maize. During the past ten years (1990/2000) there was a serious decline in crop production resulting in a reduced harvest. This was due to erratic rainfall coupled with a reduction in fertilizer subsidies. Zambia used to export maize to other countries and now there has been a ban on exports due to maize shortages and illegal trading. Currently some parts of Zambia are now reliant on food relief for livelihood. The 1980 Accord states that food security is an important goal towards economic freedom. Greater domestic production is critical to curbing food insecurity. In situations where drought affects the production of food within a country there is need for early warning signs that provided information on the food supply and demand. Such information assists governments, donors and relief agencies to plan for humanitarian assistance. Zambia's food security policy has contributed to the uncertain maize during the drought due to the huge subsidies (http://www.isse.ucar.edu/sadc/chpr4.html). The focus of the study is on women in Mpima who have also been affected by drought which led to food insecurity.

Contrary to the view that the food security policy contributed to the reduction in maize supplies, Chizhuni (1994:46-50) states that the current agriculture policy has removed subsidies and encourages liberalization. This will ensure national food security but does not guarantee household food security. Local farmers are not producing as much food due to high input costs. Some farmers retain more maize for local consumption fearing the uncertainties and price fluctuations. Attention is required on local storage to ensure that yields are not destroyed by pests. Farmers are diversifying production to include alternative food and cash crops. The government will need to provide the seed required as well as information on alternative farming methods. One of the methods being promoted is conservation farming techniques. The Mpima women in the study have also been introduced to alternative methods of farming by an International organisation. An exploration of the information provided and how it has been accepted is one of the objectives of this study.

2.4.2. Livestock situation

Sixty two percent of the major livestock share in Zambia cattle is concentrated in three provinces Central, Southern and Western Provinces. Cattle contributes at least 55% share of major livestock while other major livestock include goats 35% and pigs 10% respectively (Zambia Vulnerability Assessment Committee (ZVAC), 2007). Drought has led to drastic drop in livestock and has robed farmers of their only means of farming namely “draught power”. Disease outbreaks such as Foot and Mouth have also contributed to the livestock loss. Most subsistence farmers view livestock as insurance against severe weather and the resultant crop failure. Tembo et al (2006) adds that communities are reliant on cattle for draught power as well as income sources.

2.4.3. Water

Zambia is covered by 6% area of water whose potential is yet to be explored as a lucrative livelihood. Water is used mainly for agriculture purposes and hydro power generation. Domestic and industrial consumption accounts for only 0.5%. Reduction in rainfall especially during 2000/ 2001 and 2002 affects the water levels and use for agriculture also diminishes. According to the ZVAC (2007), Zambia has the ability of accessing ground water because of the geological conditions. Water resource management has unfortunately not succeeded to improve the captured water or to prevent the pollution and enable communities to have clean and adequate water. In 2003, 53% of the population had access to improved water sources. Rural populations still access unsafe water from wells, lakes and rivers making them susceptible to diseases in addition to reduced livelihoods.

2.4.4. Nutrition

Malnutrition and under nourishment is common in Zambia as a result of inadequate food supplies within the household due to drought. Mortality of under-fives is common due to improper feeding practices. Timing and quantity of food given to children is crucial especially if it complements breastfeeding. There are three nutrition status indicators used for under-five children, these are Height for age (stunting) weight for age (under weight) and weight for height (wasting). The reduced livelihood options in the household due to drought and other factors have resulted in malnourishment of children under five. According to the Zambia Demographic Health Survey (ZDHS) of 1992, 40% of children were reported as stunted, 25% underweight and 5% wasted. In 1996, 42% were stunted, 24% under weight and 4% wasted. In 1997 the figures increased to 47% stunted, 28% underweight and 5% stunted (ZVAC, 2007). This shows that access to nutrition has diminished and some of the reasons might be reduced food production due to drought. The WHO recommends that a child completes vaccinations before the age of 12 months.

2.4.5 HIV/AIDS

Zambia has been affected drastically by HIV/AIDS. According to the Zambian Demographic and Health Survey (ZDHS) of 2001/2 approximately 16% of the population aged 15-49 is HIV positive. There are more women who are positive than men. More people are infected in the urban areas than the rural areas. The burden of HIV/AIDS makes it difficult for families to cope with the effects of drought. Food insecurity will increase the deaths of people suffering from AIDS related illnesses. According to Mason et al (2005) there is a new phenomenon called 'new-variant famine' coined by de Waal and Whiteside (2003) suggesting HIV/AIDS is eroding agrarian livelihood and exacerbating the effects of drought on communities. The implication is that much as drought has an effect on HIV/AIDS, communities that are already affected by HIV/AIDS have a double impact of drought because they do not have adequate labour due to illness which also reduces their alternatives for coping. HIV and AIDS leads to an increase in female and child headed households who are also required to look after the ill instead of working in the fields.

2.4.6. Education

The Zambian government aims to ensure access to education for all children of Zambia. This has not yet been achieved. Currently there is a high dropout rate and more children out of school. Drought situations reduce income levels in homes which lead to children being pulled out of school. In most cases if parents are to choose the children that have to go to school, the girl child is the one that is removed from school. According to the VAC of March 2005, one of the reasons why children are not in school is due to the high costs of school fees.

2.4.7. Livelihoods

Most Zambian communities especially in the rural areas engage in casual labour, petty trade and sale of crops as the three most common sources of income. The sale of fish and formal employment is not very common. The ZVAC (2007) reported a marked drop by 13% compared to the previous season in the cereal intended for sale. The drop in production can be attributed to reduced income from previous season due to low prices or drought. Expenditure pattern assessment conducted shows that people are purchasing more cereal, other staple foods and educations due to the erratic rainfall patterns. Despite them following the land preparation patterns as well as weeding the rainfall is so erratic that yields are low. Supplementation of own produced food when it finishes has led to engaging in other forms of trade has been a way of livelihood in most communities in Zambia.

The copping strategies according to ZVAC (2007) have been to reduce meal intake. Sixty five percent of the sampled communities eat vegetables only while fifty five percent have reduced number of meals and 41% eat less preferred foods. Reduction in food intake is usually the first option although this has negative effects on the nutrition of the family. Most families are reluctant to remove children

from school but will rather reduce expenditure on health. According to de Waal and Whiteside (2003) using the 'New-variant famine' hypothesis that purports that HIV/AIDS is doubling the effects of drought in communities state that communities coping strategies are changing in the era of AIDS. The reduction in meals is not an option as it will lead to compromised health of the already ill due to poor nutrition.

2.5. Agriculture

The drought of 1991/2, 1994/5 and 1997/8 worsened the quality of life for vulnerable groups such as subsistence farmers (CEEPA, 2006). Agriculture is an important sector in Zambia since the mineral sector declined. Eighteen to twenty percent of the country's Gross Domestic Product (GDP) is generated by agriculture. It provides 60% of the populations' livelihood. Two thirds of the labour force is employed in the agriculture sector. Of the nine million hectares of land 12% of this is suitable for cultivation. Ceepa (2006) states that the cropping season in Zambia runs from November to April and it depends heavily on rain. The Ministry of Agriculture and Cooperatives announced a drought alert in March 2005. Drought during that period had affected food production in the Southern, Western and North-Western provinces of Zambia (Operations Update: Zambia Drought, by Federation Red Cross, 20 September 2005). Maize reserves had reduced to 120 000 metric tonnes compared to the 600 000 required for the entire country. The Disaster Mitigation and Management Unit (DMMU) responded to the effects of drought and shortage of food by conducting an assessment with a multi -sectoral team.

Zambia was reluctant to adopt Genetically Modified (GM) food from other countries despite the dire need to increase food reserves. The president and several ministers categorically denounced the adoption of GM products (Retrieved from Science Development Network News, November 2008).

2.5.1. Agriculture Policy

The government of Zambia, through the Ministry of Agriculture and cooperatives, developed a policy to govern agriculture production, storage and disposal through local sales and export. According to Chizuni (1994) the policy development was to liberalise agricultural production after realizing that food subsidies were weakening the economy. The policy of 2004-2015 states that the potential for agriculture production in Zambia has not been fully realized due to weather conditions such as drought, macro-economic environment and policies. The policy seeks to promote increased production, sector liberalization, commercialization, and promotion of public and private sector partnerships (Agriculture policy, 2004).

The policy further adds that increased production will require more land for cultivation and irrigation, improved evidence based cultivation methods such as conservation farming, crop rotation and low

input agriculture and increased used of animal draught power. The policy will seek to minimize the external effects of production such as poor road networks, land tenure and administration, energy, communication and HIV and AIDS (Agriculture policy, 2004). HIV and AIDS will be mainstreamed into the agriculture sector considering it is one of the major constraints in economic development.

"*The agriculture policy developed in 2004 outlines the vision for the agriculture sector up to 2015 is as follows:*

- *To achieve food security for the majority of the Zambian population through increased yields and improved post-harvest management and utilization*
- *To develop a commercial agriculture with most farmers (small and large) producing for the domestic and export markets*
- *To promote a competitive and efficient agriculture based on regional comparative advantage*
- *To develop a diversified agriculture linked to well developed agribusiness industry for value adding and exports*
- *To facilitate the entry of cooperatives and farmer organizations into highly competitive and commercial agriculture*
- *To facilitate the development of fisheries and livestock sub sectors*
- *To have agriculture that utilises natural resources on a sustainable basis for income and employment generation and economic growth*" Agriculture Policy, 2004.

The vision will target the following food crops: maize, cassava, sorghum, millet sweet potatoes, beans and ground nuts. Indigenous horticulture crops such as fruit and vegetables will also be a focus. Major cash crops to be targeted will also include cotton, tobacco, ground nuts, paprika, cashew nuts, soya beans, castor, sesame and sugar in region III. Commercial farm production of cash and export crops like floriculture and horticulture will be promoted (Agriculture policy, 2004). The policy aims to ensure food security for the population of Zambia as well as contribute to the foreign exchange earnings and GDP. Attention will be given to women and young farmers as these have been deprived before. Sustainable agriculture promotion will include afforestation and conservation farming and the use of green manure. The policy encourages farmers to grow crops that are adapted to their respective ecological regions (high rainfall, medium and low rainfall regions). There has been a marked reduction in maize production and an increase in drought tolerant crops such as sorghum, millet, cassava and ground beans (Chizhuni, 1994). In the study, the women from Mpima were introduced to alternative crops as mentioned above. Exploration on how these crops have increased their socio economic status will be assessed as this contributes to their ability to fend for themselves as well as take care of the HIV orphans in the community.

Table 1: Successes and challenges of the agricultural policy of Zambia

SUCCESSES
Economic diversification - Non-traditional exports exponential growth - Non-maize staples growing
- Competition in maize milling - Real maize-meal prices trending downwards
Cotton's market economy successes
Private sector imports all fertilizer requirements but does not market it all
CHALLENGES
Unpredictability in policies and implementation
New Marketing Act to: - Establish an agriculture marketing council - Provide for improved marketing information - Manage public storage to encourage use by agriculture investors - Harmonise stand-alone commodity Acts
Amendment of Credit act: - Appoint agency to regulate warehouse receipt systems (WRS) - Improve inventory credit issuing transferable receipts
Amendment of Cotton Act: - Rules of the game needed to protect success - Rules to ensure honest competition while not undermining input credit, extension and cotton quality

Source: FSRP/MATEP research and outreach team presentation (2007)

2.6. Disaster Mitigation and Management Unit's response to Drought

In Zambia the Disaster Management and Mitigation Unit (DMMU) is based in the Office of the Vice President. A draft National Disaster Management Policy and a Disaster Management Operations Manual are in place. These policies were developed after the realisation that the disaster management responses were fragmented and weak. The non-availability of a policy led to the following:

- ad hoc management of crisis situations
- no legal framework to guide the operations
- political interferences leading to loss of credibility of programmes

- in adequate coordination leading the risk of costly duplication
- lack of information about hazards, risks, vulnerabilities and resources
- no legal authority by Chief Executive Officer leading to delayed responses

The policy provides a framework in which hazards, risks and vulnerable populations will be managed in future. The policy recognises the existence of regional and international provisions of disasters and how they should be managed.

Zambia has set up the structures and committees such as the:

- National Disaster Management Committee (NDMC)
- National Disaster Management Technical Committee (NDMTC)
- Disaster Management and Mitigation Unit (DMMU)

These structures are at provincial, district and community level. The participation includes the Ministries of Defense, Home Affairs, Communication and Transport, Agriculture and Cooperatives, Energy and Water Sanitation, Finance and National Planning, Local Government and Housing, Community Development and Social Services, Works and Supply, Mines and Mineral Development, Health, Education, Information and broadcasting, Tourism, Environment and Natural Resources.

The main purpose of these structures is to coordinate the responses to disaster management through information sharing, capacity building of communities for disaster prevention, disaster mitigation and restoration of livelihoods and coordination. The DMMU is a critical player; they will be targeted during the report back of the study for recommendations. Most farmers require effective coordination units to support their efforts by assisting in the provision of accurate and timely information on whether patterns as well as alternatives to cope with adverse effects of changing weather patterns.

Muchinda (1999) in a paper presentation on Droughts and Floods observed that although provisions for dealing with drought are clearly outlined, the tendency is not to do anything during seasons with adequate rainfall. Both government and international organizations talk about prevention of drought but do nothing until it is time to deal with the crisis of drought. The structures as led down in the policy are not yet fully functional. This emphasises the need for the policy in place to be operationalised for easy implementation. The unit does not have a drought policy but responds to drought just as any other disaster through the Early Warning System.

2.7. Conservation Farming

2.7.1. International trends

The United States of America (USA) has been in the forefront in research on soil conservation methodologies following the recurrent devastating droughts in the 1930s. Alternative methods of farming such as conservation farming were introduced to increase yields and food for consumption. According to Anderson (1984) the new technologies of farming such as soil bunds, ridging and contour ploughing gained strength in the USA while they were rejected in Britain. The US further produced low tillage mechanised equipment and agronomic practises (Hudson, 1981). In the 1970s the reduction in oil prices further increased the interest in conservation farming as alternative for economic growth. The use of minimum tillage facilities reduced fuel consumption by 50% to 80% (Epplin, et al, 1982). The reduction in soil compaction, soil erosion and improved water infiltration was also an advantage to the utilisation of conservation farming. ECAF, 2001 conservation farming in the USA covered 35% of the total area and had an 80% production of crops such as Soya beans. Since then the USA has heavily invested in the research of minimum tillage framing techniques.

In the 1970s, regions such as South America and Southern Africa developed an interest in conservation farming following the advances in the USA. Brazil spearheaded conservation farming in South America by establishing conservation tillage research programs in Panama and Rio Grande do Sul. Nearly one-third of Brazil's cultivation area is now under conservation farming (Dersch, 1999).

2.7.2. Regional trends

During the 1970s and 1980s, Zimbabwe and South Africa also established research centres after visiting the USA (Ellwel, 1995). The Zimbabwe Agriculture Research Trust (ZART) was well established and influenced the development of conservation farming in Zambia. Zambia's bankruptcy of the agriculture sector and the drop in copper prices led to the abrupt end to the three decades of heavy subsidies for maize, fertilisers, tractors and ploughs, (Zulu et al, 2000). The country was faced with high maize mono-cropping leaving the soil degraded in low rainfall zones such as Central, Southern and Eastern Provinces. Large quantities of fertiliser was applied which increases acidity of the soil and reduced soil organic material. IESR (1999) concluded that Zambia's declining in land productivity as: *"the underlying causes relate to inappropriate farming practices, excessive erosion, increasing levels of fertiliser-induced acidity and soil compaction due to excessive and repeated cultivation"*. In 1992 Zambia was faced with a serious drought and an outbreak of a disease that affected cattle. This further reduced productivity.

2.7.3. Conservation Farming in Zambia

A response was made in the early 90s by Zambia National Farmers Union focussing on alternative farming methods. Two units were created namely the Conservation Farming Unit (CFU) and the Golden Valley Agricultural Research Trust (GART). Zimbabwe consultant was brought in to assist with the establishment of the low tillage farm trials. The notion of six to eight ton maize yields under hand hoe cultivation inspired the use of the hand hoe method under the Conservation Farming Unit in late 1995. The first trials were conducted in central and Southern provinces of Zambia. 800 to 1000 trials were conducted annually between 1996 and 2001.

Studies conducted by Haggblade and Tembo (2003) confirmed that conservation farming increases yields by 60% for both maize and cotton growers. The practise of early preparation of basins in the dry season makes them able to with the first rains before conventional farmers start preparing the land. Conservation Farmers like Conventional Farmers use HYV seeds and fertilisers which may cause challenges in attributing the yields to conservation farming practises only. However it has been noted that despite this phenomenon Conservation Farming still accounts for 700kgs per hectare compared to 300 – 400 kg due to the use of fertilisers. Conservation farming preparation has high labour costs compared to the conventional farmers who use ploughs. The CF weeding and use of herbicides cuts the labour from 79% to 15% which results in boosting the returns in the peak season by 50%.

Conservation farming has proved to increase food security in communities. The Conservation farming handbook (2007) purports that conservation farming produces excellent crops during the worst droughts. It minimises the reliance on expensive fertilisers and regenerates the environment rather than exploit it. Conservation farming discourages tilling of land so that the nutrients in the soil and the water from the previous rainfall are retained. "*Farmers who adapt this method will:*

- *reduce their costs*
- *increase their yield*
- *improve their nutrition*
- *minimise chances of crop failure in drought years*
- *increase profit*
- *increase fertility of their land*" Conservation farming handbook 2007 edition

The information pack on Conservation Farming Systems developed by the Swedish Development Agency in collaboration with the government of Zambia, outline the benefits of Conservation Farming to be the following:

- protects soil erosion and degradation
- increases fertility
- enables farmers to plan early
- captures rainfall more efficiently
- breaks up the plough pans
- enables rapid and even emergence of crops
- reduces weed population in soil
- enables more precise and efficient use of seed and fertilizer
- minimizes risk of total crop loss in drought years
- takes advantage of the interaction between different crops
- increases yield and household food security

Conservation farming employs a three course crop rotation system. This process involves the planting of maize in year one, cow peas in year two and sunflower in year three in the same basin or hole. When maize is planted limited fertilizer is applied to the basin, in the following year cow peas with its long roots will harvest the nitrogen in the ground and retains it. Sunflower in the third year will use nitrogen brought to the surface by cow peas. This process realizes an increase in yields while spending less on fertilizer considering the current world wide escalation in costs.

Crop diversification promotes the use of less drought resistant crops like sorghum and millet as opposed to maize. Early maturing varieties are also promoted in drought years. According to Conservation Farming Handbook (2007), crop stripping or mixing prevents pest infestation. Farmers are encouraged to plant ground nuts, pumpkins, okra and cow peas in gaps left by cereal such as maize. Studies show that such practices reduce the uptake of fertilizer while increasing the yield. Cow peas combined with maize pay more and increase nutritional value to families.

2.8. Mpima Community

Africare designed a project called the Capacity and Sustainability of Community Responses to Orphans and Vulnerable Children in Mpima (CABSCORM-OVC) to mitigate the impact of HIV/AIDS in Kabwe district. The aim was to address the challenges of care and support for the increasing number of orphans in Mpima area, east of Kabwe. In 2004, after receiving funds from a certain donor, Africare worked with four women's groups in Mpima, Kabwe. These groups are Twafwane, Mapalo, Mpima and Tikondane.

The project's overall goal was to build the capacity of the four women's groups to enable them to respond to the needs of OVCs through community based interventions for HIV/AIDS prevention, care and support. Specifically, the projects expected to achieve the following:

- Build the capacity of four women's groups to scale up their activities through income generating activities (IGAs)
- Contribute to the improvement of the nutritional status of the community including OVCs through the introduction of nutritious soy-based foodstuffs
- Strengthen the capacity of the community to respond to the psychosocial support needs of care-givers and OVCs in the community (Mpima Closeout report, October 2005)

During the implementation phase, the project recorded a number of successes and in particular building the capacity of the women's groups through provision of equipment such as Hammer Mill, Yenga Press (oil pressing machine), Peanut Butter Making machine and Treadle Pumps. Women were trained in the utilization of the machines, growing and processing of soy beans, groundnuts, vegetable growing, and mushrooms. Bee-keeping and Business and Financial Management training was also provided. Women's groups raised income from other activities such as poultry keeping, goat keeping and rabbit rearing. Care givers were trained in psychosocial counselling and OVCs in Child Rights as well as Life Skills. Although some successes were recorded in the project implementation, the major challenge experienced by the project was the drought in the 2004/2005 farming season. The drought adversely affected the yields for the soy beans, groundnuts and sunflower. The vegetable growing was also affected due to reduced water table in the streams. In some areas the streams had completely dried up. The drought affected the household leading to inadequate food supplies, making caring for the ever increasing number of orphans a challenge. Despite the challenges, the women's groups have continued to exhibit a high sense of commitment and hard work to respond to the OVC problem in their area.

The new project that commenced in December 2007, aimed at addressing the effects of drought faced by the women during the implementation of CABSCORM. Agriculture is the main source of income for the women in Mpima. Apart from the adverse effects of drought which was a setback for the Mpima women, most of the women relied on other people's cattle because they did not own their own. Ploughing was usually delayed as the owners of the cattle would first till their land before lending cattle to the women. Such delays led to reduced yield since farming requires timeliness. Haggblade and Tembo (2003) also states that 'because owners of animal draft power choose their time of tillage and planting, they plant first, while households who must borrow or rent plant much later and suffer significant yield losses as a result'.

Africare hopes to alleviate the effects of drought as well as late planting as they wait their turn to borrow cattle. Conservation faming, with its emphasis on early cultivation and digging pot holes as opposed to tilling the entire land will provide a lasting solution to the present challenges. Training on conservation farming, crop diversification and marketing skills were provided to the Mpima women. Training is critical to adoption of new technology as makes adoption sustainable.

Most studies have explored the benefits of conservation farming in relation to the traditional cultivation practises. Adoption has been adequately covered by Haggblade and Tembo (2003). There has not been much focus on the socio economic impact of conservation as a drought mitigation factor. This study will fill this gap and explore whether conservation farming is indeed the answer in part or whole.

CHAPTER THREE

3.0 Methodology

3.1 Introduction

This chapter highlights the research methodology used for the study. Critical issues discussed include description of the study area, sampling frame, research process, ethical issues and limitations of the study.

3.2 Description of study area

The research was conducted in Kabwe district of Central province in Zambia. The population of Kabwe is 100, 518 people with 26,518 orphans below the age of 18 years; this represents 26% of the area's population. The actual site for the research was Mpima area where the Capacity Building and Sustainability of Community Responses to Orphans and Vulnerable Children (CABSCORM) Project is implemented. CABSCORM project is run by Africare/Zambia. The CABSCORM project's responses include the promotion of Conservation Farming as a measure to improve the socio-economic status of the members. Mpima is located 30 km from Kabwe town with a population of 18, 776. Mpima is a farming community which is now faced with a challenge of dealing with ever increasing population of orphaned children. Hence Mpima community was selected because of the conservation farming intervention following the adverse effects of drought in 2003. In the midst of the social and economic problems that the majority of the community members face, the greatest challenge for the Mpima community lies in caring for the infected and affected members of its community with limited available resources. The problem for the majority of orphans and vulnerable children (OVC) and their caregivers is more specifically on finding access to a balanced nutritious diet, clothing, shelter and a proper education.

The study will focus on the 72 community members mostly women, trained as trainers in psychosocial support and life skills, which were are affected by the drought. These women had targeted to assist orphans in their community. At the moment these women have 300 orphans under their care. Traditionally projects have provided orphans with food, school fees, clothes, or blankets as a way of alleviating their problems. These hand-outs encourage dependency and are not sustainable if done exclusively. The project sought to increase the women's capacities to care for their orphans by providing them with seeds and fertilizers for nutritious crops and the inputs necessary to run income generating activities (IGAs). By growing nutritious foods and making money from their income, generating activities the women are better able to care for the orphans due to the enhanced socio economic status.

The map below shows the location of the study.

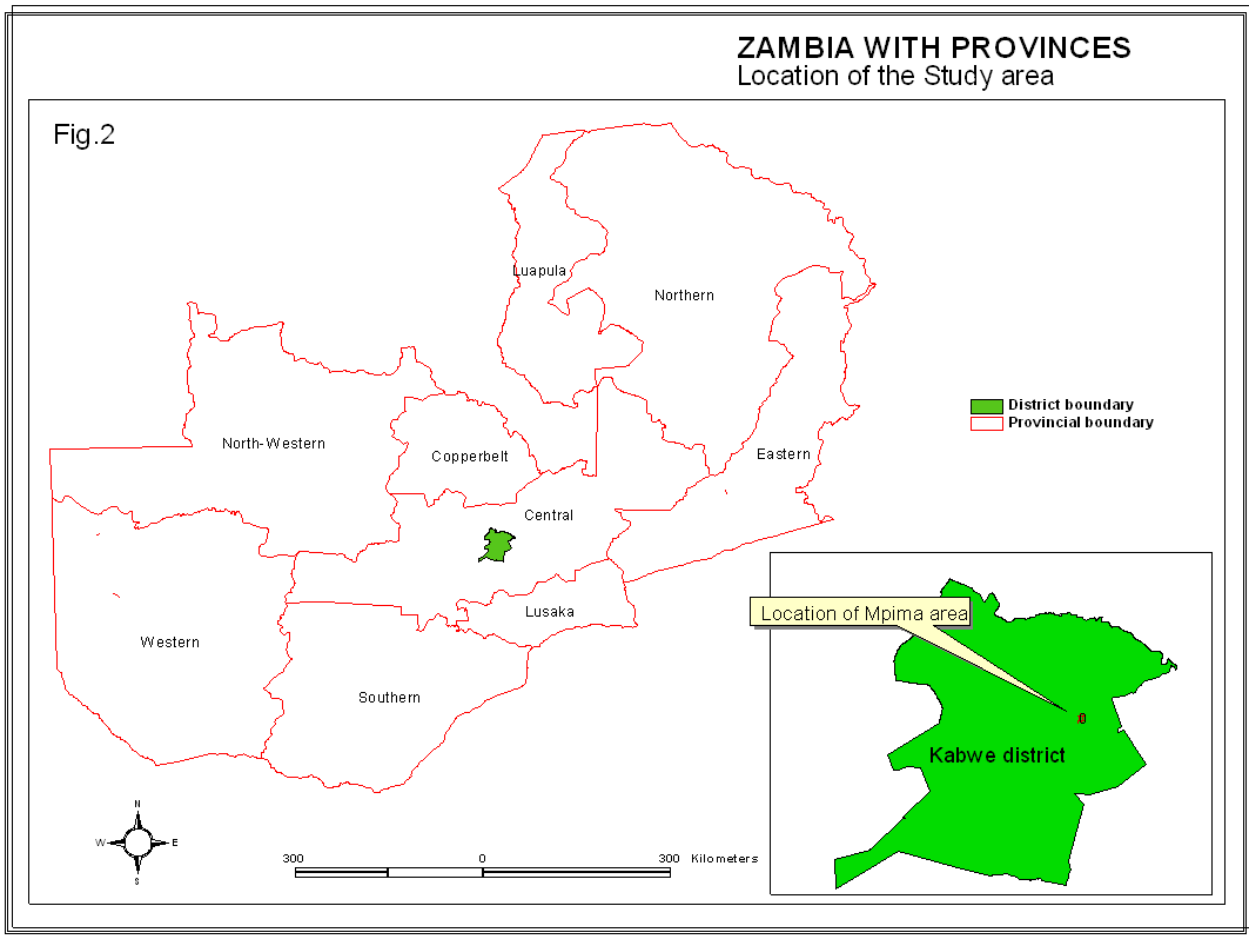

Figure 2: Location of the study area

3.3 Research Design

The study used a case study approach with emphasis on both qualitative and quantitative research methods. Whereas quantitative enabled to focus a wide range of variables, qualitative on the other hand helped to obtain an in-depth understanding on the selected variables.

3.4 Research Instruments

Three major research instruments used were one-one questionnaire, Focus Group Discussion (FGD) and an interview schedule. The instruments were used as follows:

- Questionnaire: The research used one on one questionnaire to provide understanding of the women's experiences before and after they started practicing conservation farming.
    - With the questionnaire one is able to analyse in a quantifiable manner using closed-ended questions. On the other hand, the few open ended questions incorporated in the questionnaire gives room of not closing up the responses as certain things may not be

known by the researcher (Retrieved from http:/www.statpac.com/survey/research-method.htm on 15 September 2009).

- FGD: Focus group discussions with leaders of the women groups were conducted.
    - It is assumed that when you are interviewing a group people tend to be free to explore more than when they are alone. The major advantage of a larger group is that as someone comments the comments act as prompters for further comments from the other group member(s) (Retrieved from http:/www.statpac.com/survey/research-method.htm on 15 September 2009).
- Interview schedule: This instrument targeted the Africare District Facilitator in charge of Kabwe who is responsible for the CABSCORM project.
    - The schedule targeted key informers as they are said to be knowledgeable in that particular area, conservation farming in this case. Their commentary helps to understand what you are trying to find out in a detailed manner (Retrieved from http:/www.statpac.com/survey/research-method.htm on 15 September 2009).

Finally, blending the three techniques of eliciting the responses from the target group gives validity to the findings. Each approach is from a different perspective but commenting on the same issue. The three instruments also provide room for triangulation in validating the findings.

3.5 Sampling

Purposive sampling method was used to select the respondents for the questionnaire as well as choosing the representatives from the women groups for the FGD. According to Grinnell (1981:87), purposive sampling is used when the researcher has enough knowledge of the population in question in relation to the problem and selects the people for inclusion in the sample.

There are six (6) women groups in the CABSCORM project. Each group has a total membership of 15 which translates into 90 women who had been provided with education and support in conservation farming. Out of 90 seventy-two (72) women were sampled as respondents for the questionnaire as shown in Table 1 on the next page. Hence the selected sample was 80% of the population receiving Africare interventions. Grinnell (1981:89) states that sample size is dependent on the type of population and the nature of research questions. However, it's worth noting that 7 of the sampled respondents had joined in 2008 and 2009 which had an implication on results as they had not really realized the full benefits of conservation farming being new entrants.

Six focus group discussions were held with 12 women leaders. In addition an interview was conducted with an Africare staff to understand the type of support provided and the progress made that far.

Table 2: Number of women sampled by group and village

Name of women group	***Village***							***Total by group***
	Barrack	***Chankosa***	***Chuundu***	***Dairy scheme***	***Kafuto***	***Salisbury***	***Simon***	
Mapalo women	0	1	0	0	2	3	6	12
Masengu women	11	0	0	0	1	0	0	12
Mpima women	0	0	0	12	0	0	0	12
Tikondane women	0	0	0	12	0	0	0	12
Twabuka women	0	0	0	12	0	0	0	12
Twafwane women	3	0	1	0	6	0	2	12
Total by village	***14***	***1***	***1***	***36***	***9***	***3***	***8***	***72***

3.6 Research process

The Researcher sought permission from Africare to conduct this study in the named area above. Data generation instruments were then developed after which a Research Assistant was engaged. It must be mentioned that as a result of the targeted respondents being spread in a wide area, the Research Assistant had to resort to staying within Mpima area for a week, until the data generation exercise was accomplished.

The Research Assistant made appointments schedule with leaders of the six women groups. The purpose of the research study was explained to each group before administering the questionnaires and FGDs. In total, 70 questionnaires, six FGDs and an interview schedule were administered.

Once the data had been generated, it was subjected to data cleaning, analysis and interpretation. A research report was then developed. The research project starting with topic development, research design, data generation, analysis, interpretation and report writing took a total of 12 months.

3.7 Ethical issues

In conducting this study issues such a confidentiality of the respondents' identity, disclosure of the purpose the study and volunteerism of the respondent were observed. In addition, the Research Assistant avoided undue pressure on the part of the respondent during data generation process.

3.8 Limitations of the study

There were no major limitations to the study except for two, namely: the delay in obtaining permission from Africare to conduct the study as well as the unavailability of the Africare District Facilitator to give guidance to the Research Assistant.

CHAPTER FOUR

4.0 Presentation of Findings

4.1 Introduction

This chapter focuses on the findings from the research. The findings are aligned to the research objectives. The analysis includes pie charts, graphs and tables to present different results.

Mpima CABSCORM Project area covers Mpima ward with a population of 18, 776 (9,190 female and 9,586 male). There are 3,208 households (Census of Population and Housing, 2000) within Mpima ward.

4.2 Acceptance of conservation farming

4.2.1 Farming methods used

Most women used conservation farming method as compared to those who used conventional farming as shown in table 2 below. This means that 85% of the women have accepted conservation farming while only 15% are still using conventional farming. One of the FGDs observed that "the Conservation Farming practices we use are potholing and ripping". In addition, the District Facilitator explained that other farming practices such as crop rotation and crop diversification were used by women farmers in Mpima. The crops they grew were maize, sweet potatoes, soya beans, sunflower, cowpeas, beans and groundnuts.

Table 3: Types of farming methods practiced by respondents

Type of farming practice	***Women using the method***	***Women not using the method***
Conservation farming	61 (85%)	11 (15%)
Conventional farming	46 (64%)	26 (36%)

Notes:

- 61 out 72 women interviewed practice Conservation Farming
- 37 out 72 women interviewed practice both Conservation Farming and Conventional farming
- 11 out of 72 women interviewed did not practice Conservation farming
- 26 out 72 women interviewed did not practice Conventional Farming

In terms of land cultivated most women were cultivating between 2-4 limas. This can be attributed to the fact that the Africare CABSCORM programme then promoted at least 2 limas to be cultivated under conservation farming by each woman under the programme. However, it is interesting to note that still more women are not limited by this requirement of 2 limas. While about 3% of the women

were cultivating only 1 lima, 58% cultivated more than the requirement of 2 limas. This also implies that there is 97% adoption of conservation farming. This is a very high adoption rate realizing that 10% of the respondents joined the CABSCORM program in 2008 and 2009 with only one practical farming season by the time they were interviewed. This shows high appreciation and acceptance of conservation farming. Figure 3 below shows the proportions of land cultivated by each woman.

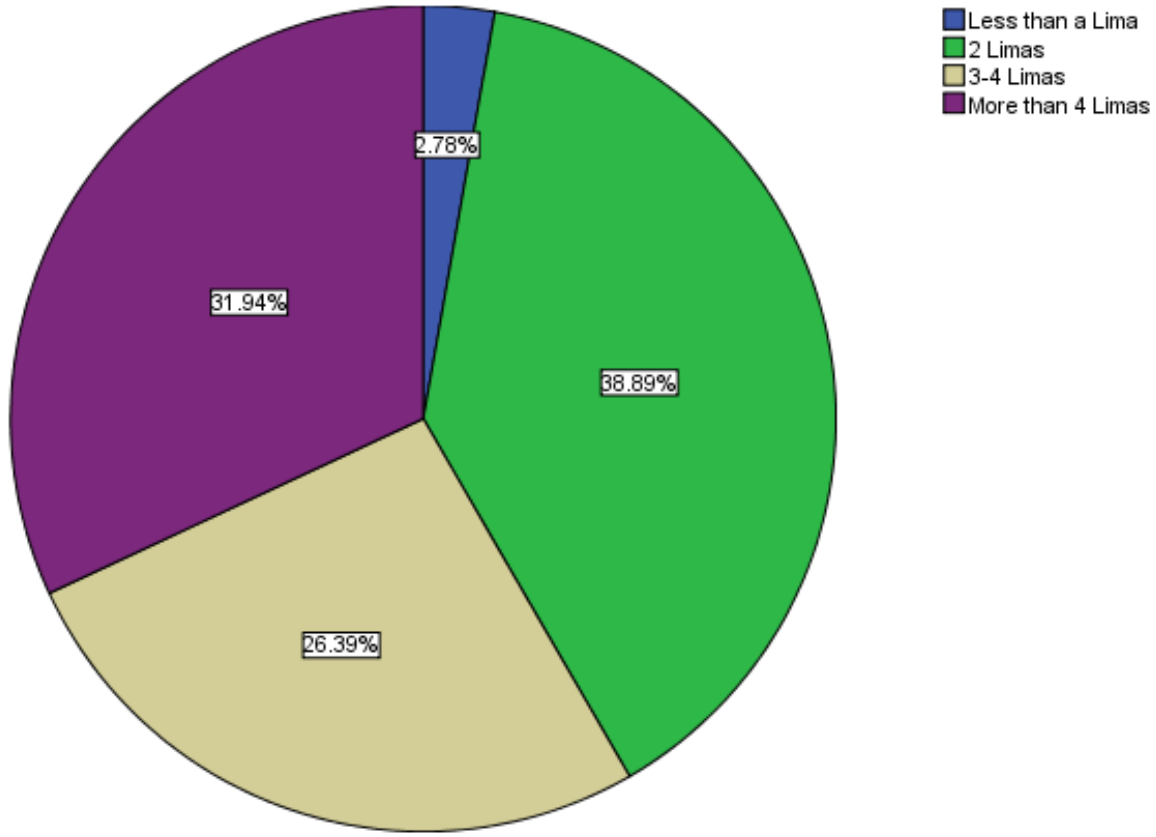

Figure 3: Land cultivated

Mpima women were partially adopting conservation farming technology as expected in communities where agriculture is the only source of food security. Africare must be commended for providing effective education to the Mpima women as demonstrated by the rate of adoption. As the women realize the effectiveness of conservation farming more women may adopt fully. Climate change is another factor that may contribute to full adoption. During the period in question there has been drought followed by floods making it difficult to totally prove the effectiveness of conservation farming.

4.2.2 Implements used

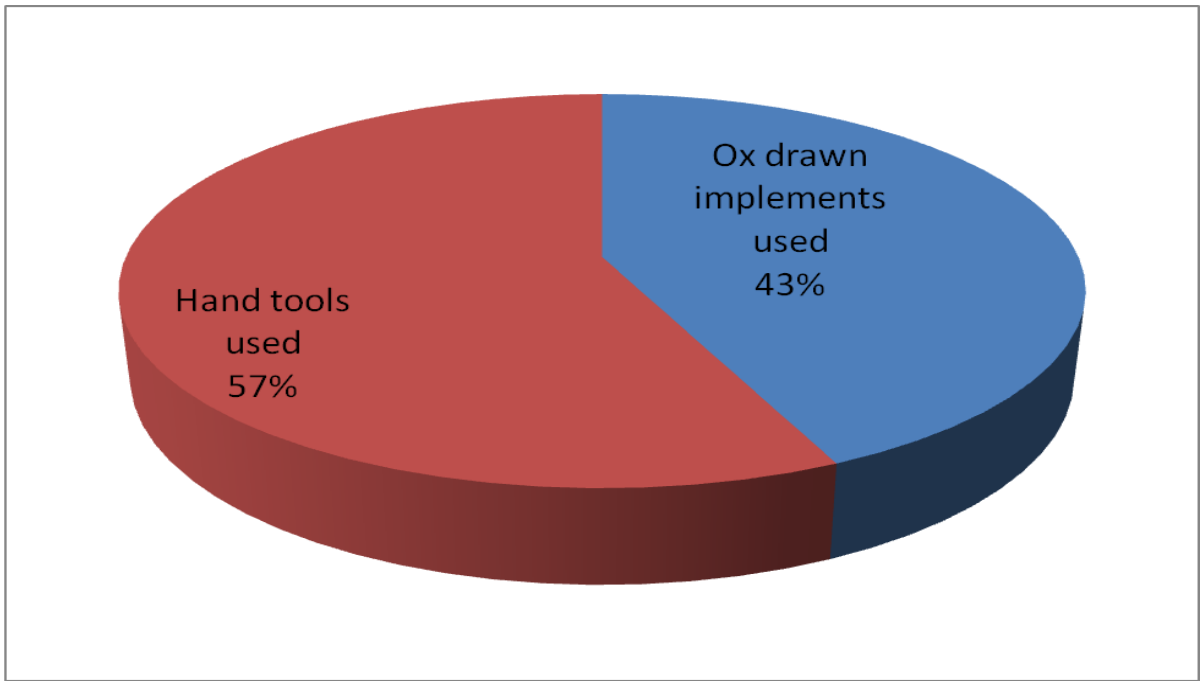

Figure 4: Type of implements used

The types of implements used for farming are hand tools and ox-drawn implements as shown in figure 4 above. The findings are typical because the majority of the Mpima women do not own cattle. Conservation farming provided the freedom of not relying on others for their cattle which usually delayed tillage. The conservation farming Handbook (2007:3) states that use of oxen in Zambia had been reduced due to death of cattle during the long dry season. Yields were affected because initially no ploughing meant there was no planting. However, conservation farming emphasises the use of pot holes which is revolutionary for most framers that have no oxen. The percentages of women using ox drawn implements is still fairly high at 43% which is also a sign of gradual adoption of conservation farming especially for those that have oxen. This also confirms the notion that economic status can work for or against adoption. In this case those who own oxen do not perceive total adoption as an option because they were not affected by the delays in ploughing experienced by women with oxen.

4.2.3 Type of Labour used

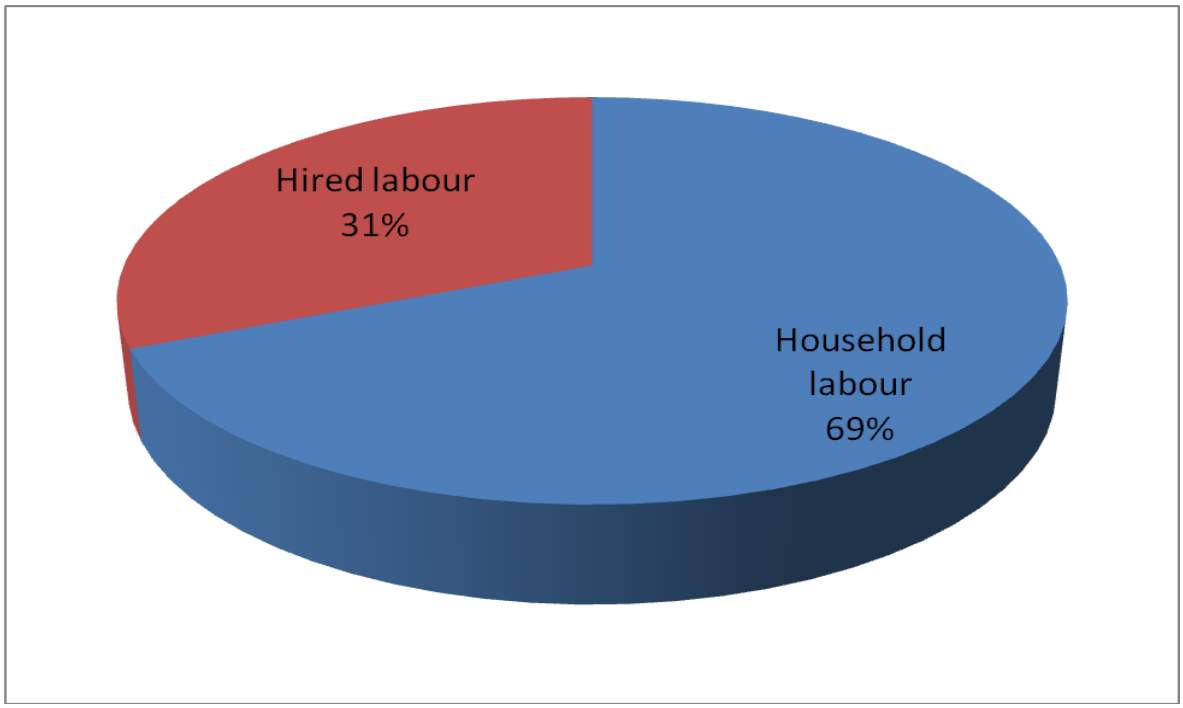

Figure 5: Type of labour used

Household labour was more common than hired labour as shown in the pie chart above. The socio-economic status of women does not warrant them to afford hired labour. As a result most of the work in the field is done by the women and some family members. Some of the women are widows and therefore did not have husbands to assist them. However, even those that had husbands were not assisted as much as would be expected due to the initial labour intensity of conservation farming which is different from ox-drawn ploughing. Hence generally the proportion of women labour-force involved is higher than that of men as reflected in section 4.2.4.

4.2.4 Percentage Distribution of Day's Work Involvement by Sex

Though at planting the ratio of female to male is almost 1:1 but at weeding and harvesting women representation surpass that of men by 20% as shown in table 3 below. The population of Zambia equally has more women than men which denote the key role of women in the agriculture sector. On the other hand, conservation farming is labour intensive during weeding in the early years. According to Haggblade and Tembo (2003:2) weeding is intensive during the initial years due to the field preparation which leaves 85% of the land surface untilled during potholing. Most farmers dread the

labour involved which is usually the determining factor on whether they will adapt or not. Women have been known to adopt more than men and they are more hardworking. While women in agriculture are faced with challenges of lack of finances and inputs they still are committed and realise yields which ensure food security.

Table 4: Percentage distribution of day's work by sex when planting weeding and harvesting

Sex	Representation (in %) When:		
	Planting	Weeding	Harvesting
Female	51	60	60
Male	49	40	40
Total	100	100	100

4.2.5 Cropping Systems practised

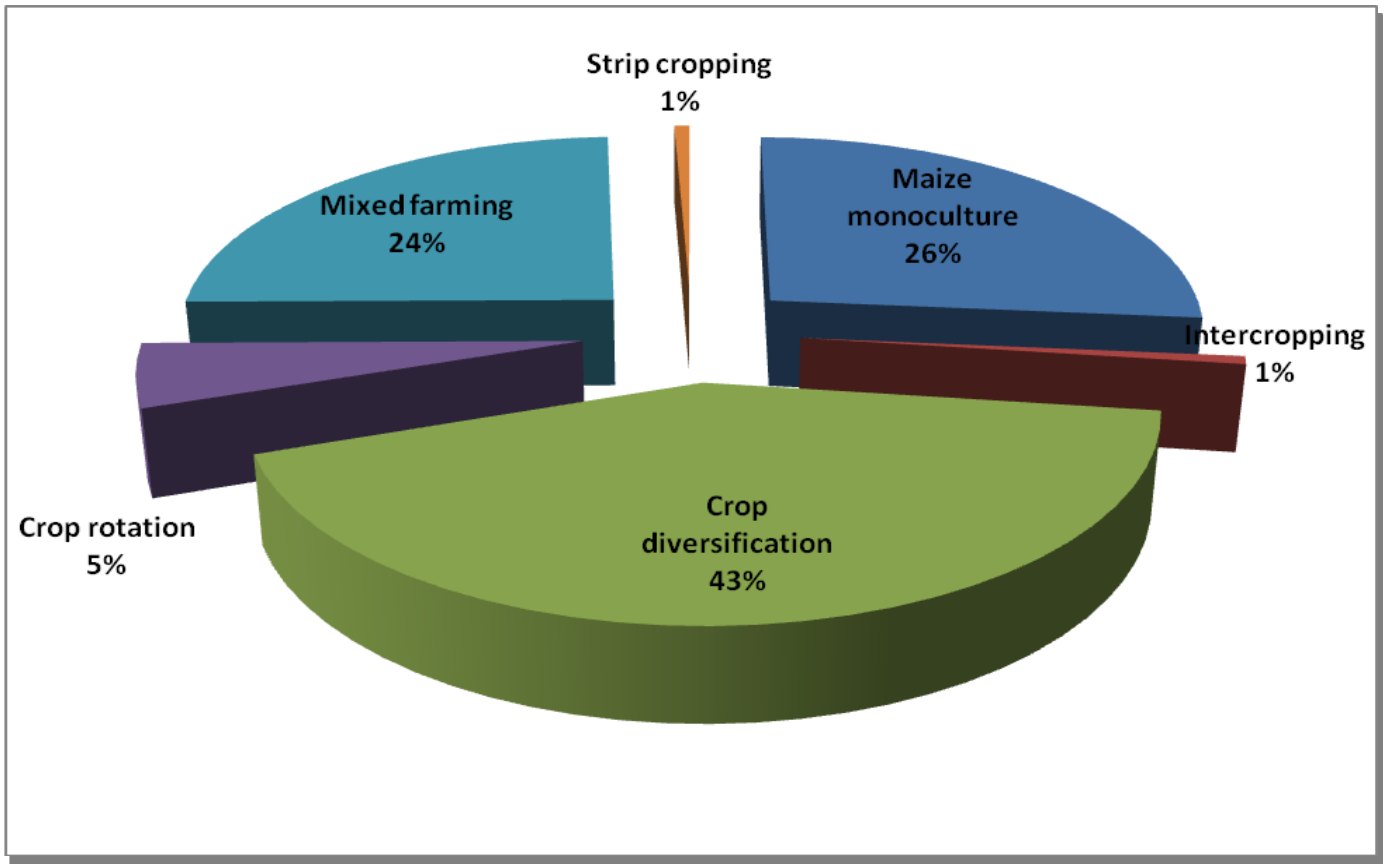

Figure 6: Cropping systems practiced

The major cropping systems that are practiced are crop diversification, maize monoculture, mixed farming, and crop rotation, respectively as shown in the pie chart above. The leaders for the women groups also agreed with these results in that the successful cropping systems they listed included

crop diversification, maize monoculture, mixed farming and crop rotation. The arguments that were given were that first crop diversification encourages the growing of more than one crop so as not to put “all your eggs in one basket”. This also matches with the Africare requirement that each woman should cultivate at least 2 limas i.e. 1 lima for a cereal crop and another lima for a legume. Secondly, maize monoculture was widely practiced not only in Mpima but most areas of Zambia as maize is the staple food crop of the country. Mixed farming and crop rotation encouraged sustainability of the soil structure and fertility. Crop diversification, in particular is key in conservation farming as various weather patterns may favour one crop’s growth which in turn results in a good harvest. The use of crop diversification is also shown by the different varieties of seeds used in section 4.2.6. The next largely practiced system is maize monoculture because this is the staple crop, so there is a tendency to repeatedly grow this crop every year. As a way of maximising profits the women some times are driven to grow more of the staple crop because it sells faster and the returns are guaranteed.

Conservation Farming is a cultivation system or land preparation option that can be integrated into the systems in Fig 6, as a drought mitigation strategy since it allows for the early preparation of land and not much earth is moved leading to low soil moisture losses, in comparison to conventional tillage that leads. Conservation farming has been observed to conserve soil moisture, which is an attribute for its success in minimising the effects of drought in all cropping systems.

4.2.6 Seed Varieties used

Four (4) major seed varieties namely early maturing, late maturing, medium maturing and drought tolerant seed varieties are used by the women interviewed and these are shown in the pie chart below.

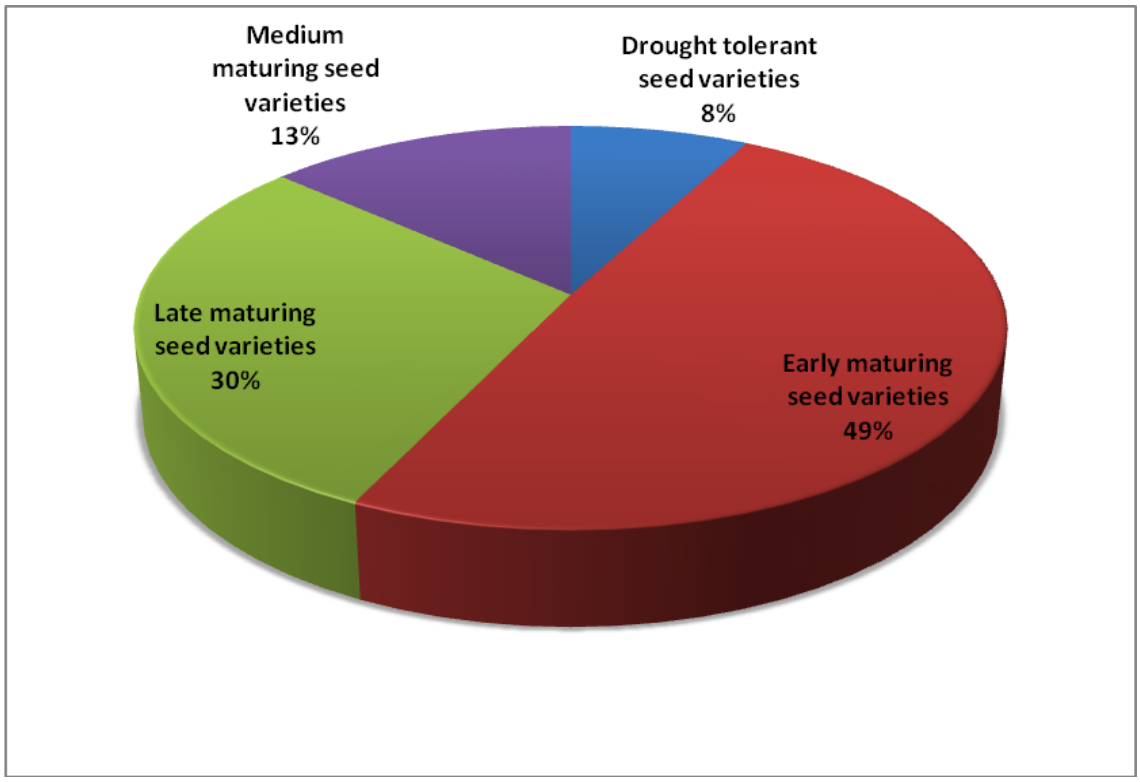

Figure 7: Seed Varieties used

Early maturing and drought seed varieties are important as they sometimes survive drought situations. Hence women grow such varieties to ensure that they still harvest something even though there is erratic rainfall. However, the women also grow late maturing seed varieties in case there is too much rainfall such as floods; this entails that such varieties would take long to mature and thereby survive rotting while in the fields. During normal rainfall conditions all varieties, including medium maturing varieties, result in good yields.

Figure 7, shows that the varieties of choice are mainly Early maturing varieties, this shows the awareness of the community towards the fact that drought affects their crop yields, this is a strategy that can help in minimizing the effects of drought especially if planting is done on time. Conservation farming provides the ability to accurately time planting if land preparation is done on time. The major setback though is that when the amount of rainfall is not adequate the variety despite its early maturity status cannot with stand moisture stress. Therefore there is a need then to increase the use of drought tolerant varieties to give the women some harvestable yields during adverse conditions. There is a correlation of conservation farming methods and choice of variety, so in a bid to reap as many benefits from the conservation farming system the women have attempted to maximize on use of early maturing varieties, unaware that drought can still affect these varieties. An introduction to more drought tolerant varieties will go a long way in alleviating effects of drought.

The use of late maturing varieties is also evident and this is probably because late maturing varieties are high yielding and attractive, but they require adequate rainfall to produce the best yields. When drought occurs these are the hardest hit crops and if grown on large scale will result in great losses, leading to chronic food shortage. Therefore it is important to increase the awareness of drought tolerant crops and actually reduce the proportion of late maturing varieties, to alleviate effects of drought.

4.2.7 Crops grown

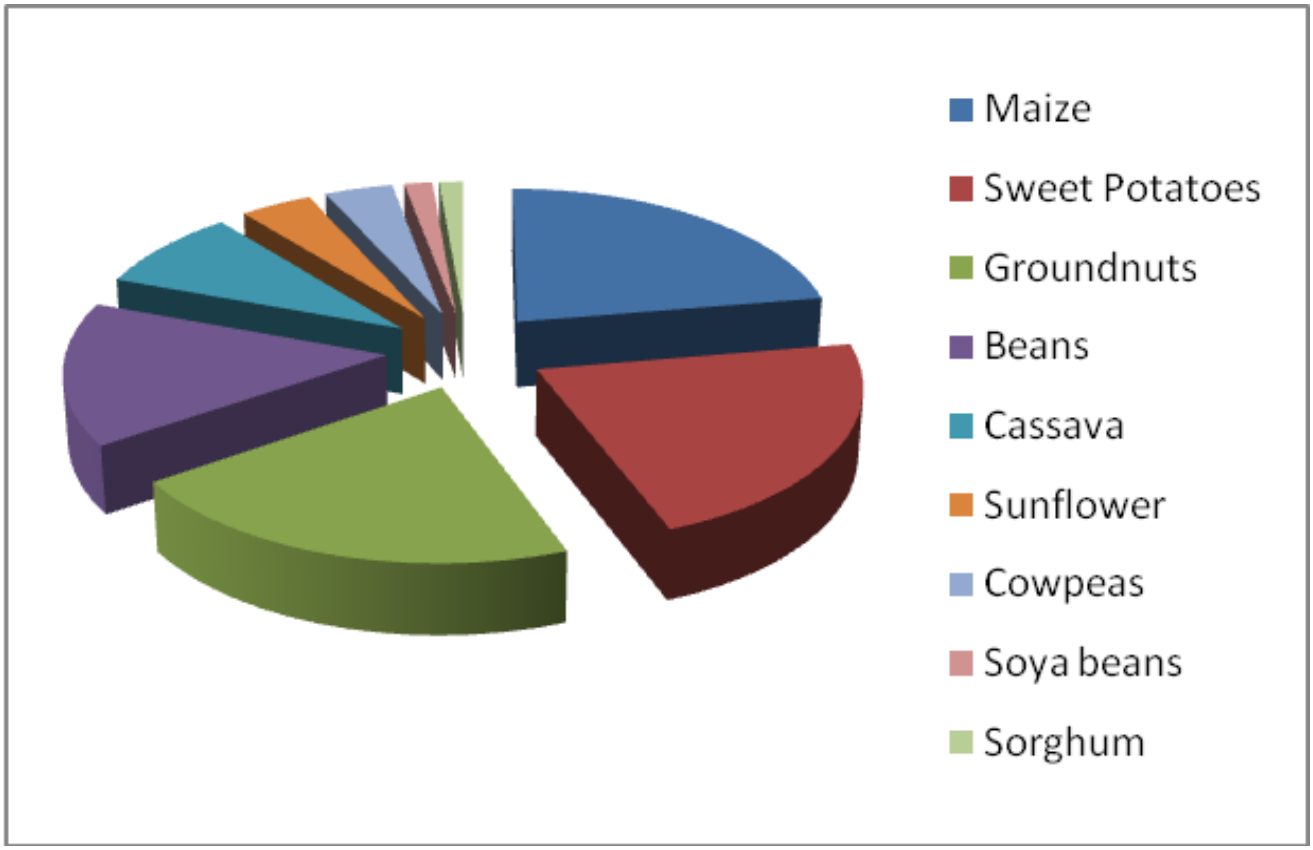

Figure 8: Major crops grown by Mpima Women

Crops grown, in order of importance, are as follows: maize (99%); sweet potatoes (97%); groundnuts (94%); beans (67%); cassava (38%); sunflower (18%); cowpeas (17%); Soya beans (7%); cowpeas (6%). The percentages show what proportion of the respondents grow that particular crop implying the total expected percentage for each crop is 100 %. The growing of all these crops match with the cropping systems such as crop diversification (selection of crops quiet diverse, 9 crops grown) and maize monoculture (99% reliance on maize crop).

Other crops which are not grown on large scale included rice, pumpkins, tomatoes, water melons, and vegetables. Conservation farming as a food security measure has been shown in this research to have the potential to minimise effects of drought, as shown by 65% of the respondents who practice

conservation farming. There is evidence that there are other strategies employed to mitigate the effects of drought, and to ensure food security, these strategies include early planting, increasing amount of food in storage for home consumption, crop diversification, business management and gardening.

Conservation farming has also shown that besides just improving the food security of the household it also improves and helps to maintain the land resources thus keeping the farm land productive for the incumbent seasons. This farming method also helps to empower the women of the community as they become self reliant in terms of land preparation and crop management practices such as weeding and fertiliser application, this is shown by their ability to get their land prepared on time, and to plant on time, in comparison to those who rely on ox-drawn cattle, and they benefit from the most valuable resource of time.

4.3 The Importance of conservation

The research revealed that 65% of the respondents employed conservation farming as a strategy to ensure food security. Other strategies adopted to attain food security were early planting, keeping enough food for home consumption, crop diversification, business management and gardening.

4.4 Socio-economic effects of conservation farming

4.4.1 Crop production proportions

The top three crops produced are maize, sweet potatoes and groundnuts as shown below by the production proportions in terms of kilograms harvested by crop. The top ranking production is for maize as 99% of the respondents grew this crop being a monoculture. This is an indication of food security as maize is mostly grown for consumption and only the surplus is sold. The other two crops grown include a legume, groundnuts, as per Africare requirement. This is a good indication towards attaining a balanced diet for the women farmers as they also grow other produce like vegetables which are eaten with maize-meal and groundnuts.

Table 5: Crop production proportions

Crops grown	Total production figures (in kg)	Average production per woman (in kg)
Maize	2,075	29
Sweet potatoes	1,309	18
Groundnuts	859.5	12

Note: The other crops not shown above have production amounts about 1 kg or less per woman.

4.4.2 Crop Sales

Just looking at total crop sales only does not provide a comprehensive picture as shown in figure 8 where in 2005/6 season the sales were at highest followed by 2007/8 season and then 2006/7 season. However, analysing the crops produced and sold gives an idea of the differences. Crops sold include cotton, groundnuts, sweet potatoes, soya beans, sunflower, beans, cassava and maize. It was highlighted that the production and sales increased in terms of the staple crop i.e. maize. This implies that the women groups drifted from producing more of cash crops like sunflower to the staple crop based on the agricultural information they received from Africare. This drifting would ensure food security for them i.e. able to sell more maize in the last agricultural season but also able to keep more of the produce for consumption.

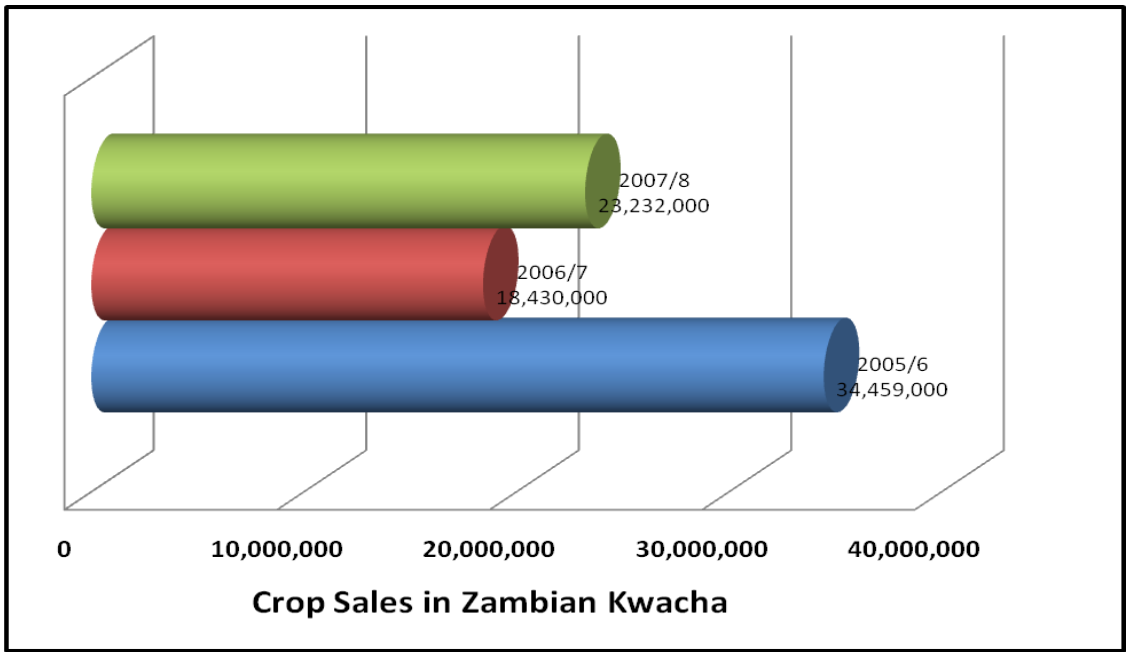

Figure 9: Crop Sales from 2005/6 agricultural season to 2007/8 season in Mpima, Zambia

It was also indicated that among the 81% who sell their produce, only 36% remain with enough produce for consumption while 64% do not. Hence some of the money realised from the sales is used for buying more food and inputs whereas some use it for buying home requirements like groceries and clothes, paying medical fees and hired labour, and re-investing in other profit-making ventures like poultry production. An interesting finding was that 57% of the respondents used the money realised to meet school requirements like fees, books and uniforms for their children which is a step ahead towards their socio-economic development.

4.4.3 Income

The main source of household income is farming as reflected in table 6. All the 72 women who were sampled are engaged in some farming activities. Other sources of income practiced by not more than

two women per category were poultry, charcoal burning, selling bananas and beer brewing. Hence farming, and specifically conservation farming, has positive effects on the socio-economic status of the women farmers as it has positive influence on income and education of the households who realize this income.

Table 6: showing the main source of household income

Source of household income	*# respondents*	*Percentage*
Farming only	40	55.6
Farming and other wage business	30	41.7
Farming and wage employment	2	2.8
Total	**72**	**100.0**

4.4.4 Crops grown for consumption

The majority of the respondents, constituting 78% of the total, grow specific crops for their own consumption. The other 22% do not grown specific crops for consumption. This is shown in figure 7. The fact that majority of the women grow crops specifically for consumption is an indication that they have food security at heart. The other women who did not grow crops for consumption were selling the produce and the income realised were used for other home requirements and as start-up capital for businesses.

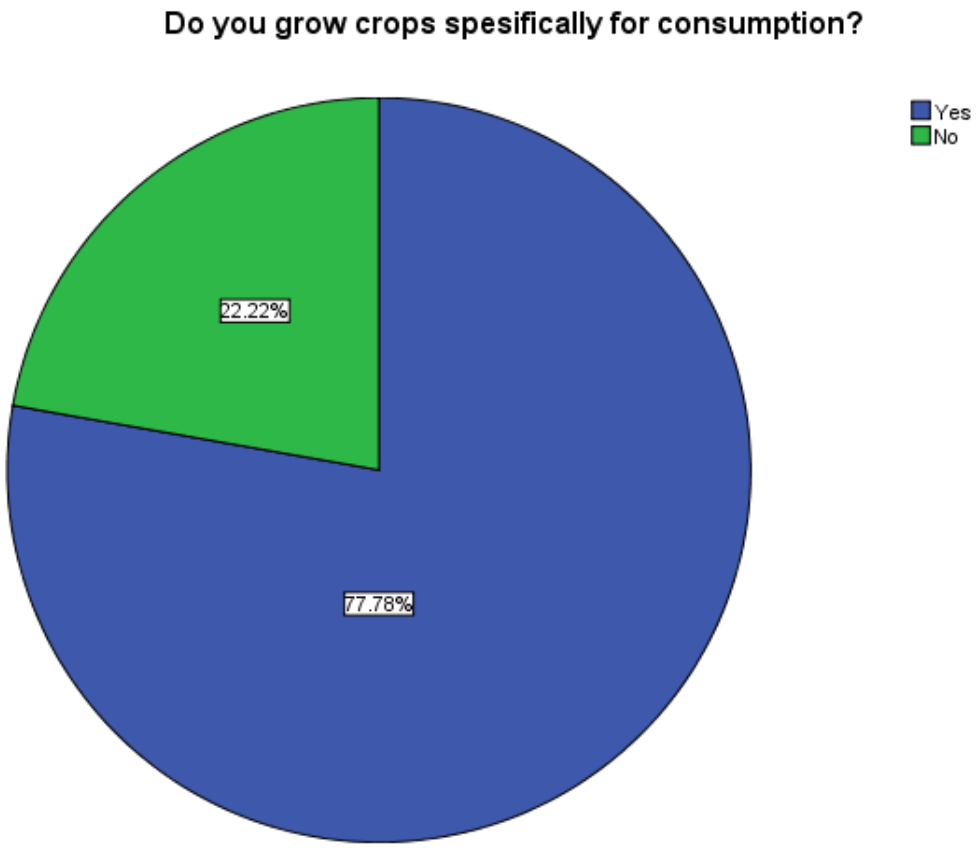

Figure 10: Whether respondents grow crops for consumption

The crops grown for consumption, in order of importance, are: beans, maize, sweet potatoes, groundnuts, cassava, sunflower, sorghum, and others like Soya beans, water melons and pumpkins. While maize produce is highest in terms of quantity, part of the produce is sold out to meet other home demands like sending children to school.

The large proportion of respondents indicated the desire for food security at household level before selling their produce, owing to the nature of their type of farming which caters mainly for the household and only surpluses are sold. This trend can be attributed to the current situation that the farmers endured having been affected by some adverse climatic conditions at the time of the research. The majority were mainly concerned about consumption as the environment did not allow them to realise any surplus to sell. Probably if the similar question is raised when they have experienced bumper harvests the trend would most likely shift towards growing crops for business.

The other reason stated for growing crops mainly for consumption, is that even when the need arises to sell, the crop will be on demand, and this also allows the women to trade, not necessarily with

money, but crop for crop e.g. if one has a good maize harvest land another a good sweet potato harvest, a barter exchange can take place and this will still leave the women food secure. Therefore as Fig 10, shows the larger proportion inclining to consumption, table 7 shows the types of crops grown for consumption which can help to verify the crop for crop trade scenario. The crops shown in the table are of high nutritional value, the percentage representations show that the crops such as beans and maize play a major role in food security in the Mpima community.

Table 7: Crops grown for consumption

Crops grown for consumption	***# respondents who grow the crop***	***Percentage representation***
Beans	33	46%
Maize	24	33%
Sweet potatoes	23	32%
Groundnuts	22	31%
Cassava	14	19%
Sunflower	6	8%
Sorghum	4	6%
Others (soya beans, water melons & pumpkins)	3	4%

4.4.5 Difference in Well-being

In terms of difference in well-being almost two-thirds of interviewees indicated that they had experienced a difference in their wel-being since they joined the Africare women groups as figure 11 reflects. This was an indication of betterment of life as a result of income increase, investments and savings. These can be attributed to the sales realised from the sales discussed in section 4.4.2.

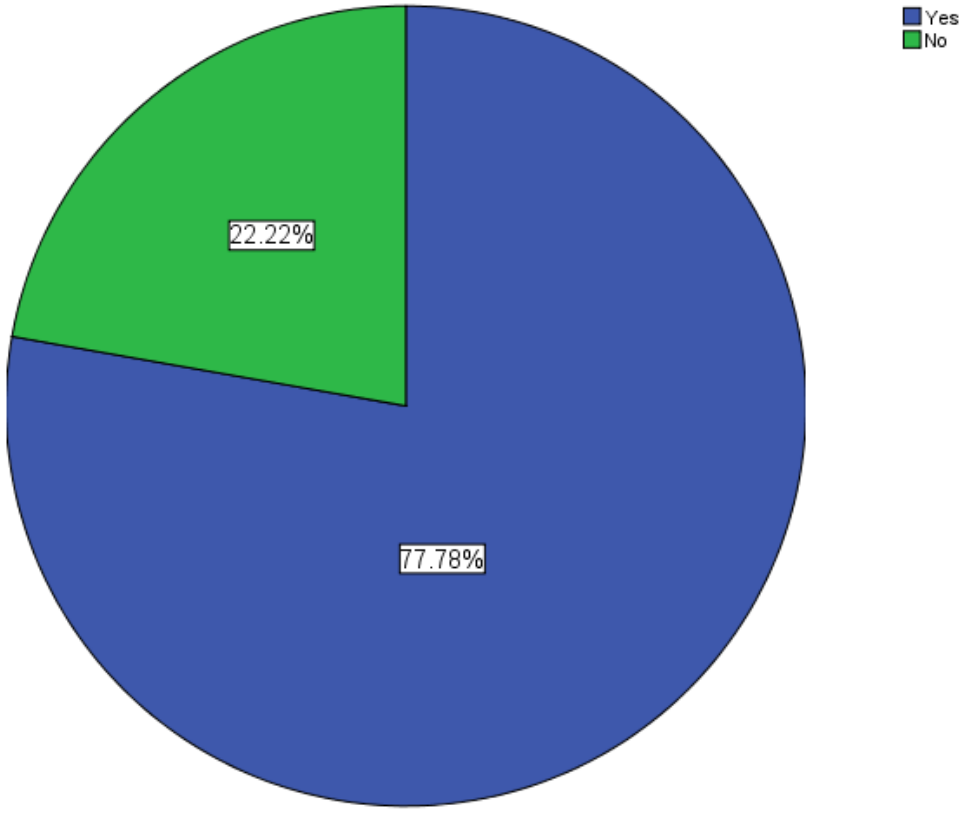

Figure 11: Whether respondents have experienced a difference in well-being

Table 8: Differences in income, investment and savings

Change	# *respondents*	*Percentage*	Comment
Increase in income	40	55%	Due to higher yields attributed to new farming methods and other business and financial management skills gained
Started investment	15	20%	Some re-invest in agricultural production while others engage in small scale businesses like sell fish, clothes and other small scale businesses
Able to save	23	31%	Women have saving groups which encourages them to save their proceeds

The Africare women farmers have experienced positive change in terms of their income, investments and savings. Increases in income have been experienced by more than half of the women (55%). To begin with, income is realised through better harvests thereby able to sell part of their produce especially cash crops. Better harvests in this case can be attributed to conservation farming method. Moreover, income is also realised through their group business like selling fish and second-hand clothes. Similarly, on the issue of investments, respondents indicated that there is a bit of difference

for the better. This is also true over savings. The main complaint by all respondents over income, investments and savings is the fact that rains have not been enough. Consequently, not only does the prevailing dry spell results in poor harvest but also less gains in terms of income, investments and savings. All in all, lack of ample rainfall tends to be the major setback among the interviewed women.

Nevertheless, neglecting the drought situation, most respondents pointed out to other changes for the better in their involvement in the CABSCORM programme. Firstly and foremost, farming is now different due to conservation farming which is used. This makes the women do the work without waiting for cattle labour – after all, most of this animal labour was wiped by the corridor disease. Hence, women are able to dig planting basins on their own – deploying their own labour. The conservation farming package has enriched the women in their farming knowledge. Through this, they are able not only to prepare their land early but also plant early. Moreover, women have also saving groups which encourages them to save their income.

All in all, the CF package has been an eye opener to the women thereby encouraging them to cooperate and compete favourably with their male counterparts. Some women are even able to contribute in sending their children to school. Of course, despite the above-realised benefits, still the rain problem is a drawback which has hindered women to harvest the full package of the CABSCORM Programme.

4.5 Challenges affecting Women in the agricultural sector

The challenges women encounter in the agriculture sector were established as follows:

- Lack of inputs and implements (69%)
- Lack of enough land (60%).
- Drought and flood (50%)
- Lack of capital for business (30%)

The major challenge affecting women in the agriculture sector is lack of inputs and implements, which affected the women as thier labour in conservation farming requires alot of implements. This is due to the fact that normally women look to their husbands for guidance and instructions. As a result even the existing systems tend to favour their male counterparts. Relatively fewer women tend to benefit from the fertilizer support pack programme which is a government programme through which inputs are provided to rural but viable farmers. Hence programmes like the Africare CABSCORM programme are a big blessing to the women as they are not only taught to fend for their own inputs but also some input packs are organized for them.

Generally speaking, women also lack enough land for cultivation. Meanwhile land is another key factor in agriculture production. Labour can be there but without land it is impossible to cultivate. Even when women are given land, they are normally given those portions/plots which have been used over and over while their husbands or men counterparts go for the most fertile. All in all, women normally lack fixed land/fields but instead they have to ask for fields year after year. This is due to the customary laws which are still upheld.

The third challenge namely drought and floods is a natural phenomenon which women have no control over. This factor affects even the success of conservation farming method. However, with the various farming practices like crop diversification and growing of drought tolerant seed varieties the CABSCORM women are equipped to survive the worst effects of droughts. The fourth and last challenge enlisted by the women was lack of capital for businesses. However, some women as reflected in table 8 are able to use the proceeds realised from crop sales into business ventures like selling fish and second-hand clothes.

4.6 Recommendations for improvement

In terms of how Africare can improve in their operations, figure 12 shows the responses.

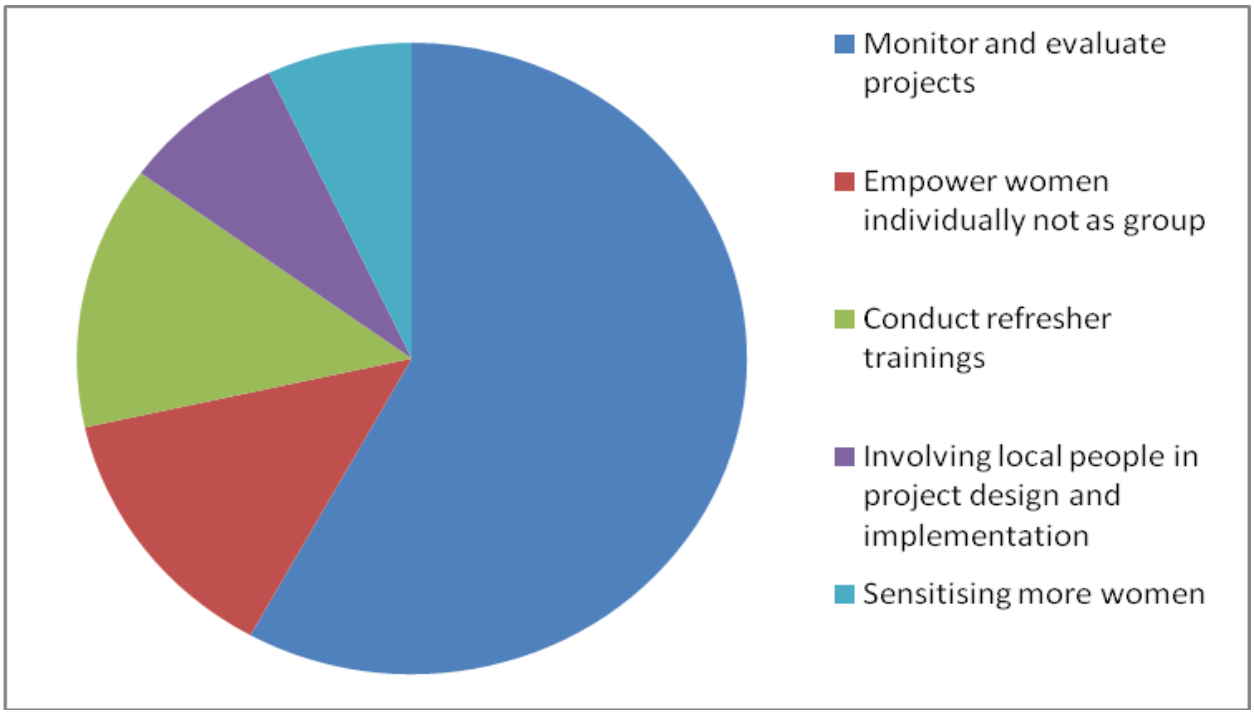

Figure 12: Recommendations on how Africare can improve operations

The recommendations on how Africare can improve operations were the need to: monitor and evaluate projects (58%); empower women individually not as a group (13.5%); conduct refresher

trainings (13.5%); involving local people in project design and implementation (8%); and sensitising more women (7%). The need to monitor and evaluate projects is vital to make necessary adjustments or improvements or just sustaining certain programmes. Women empowerment was recommended due to the fact that some women do not take responsibility hence the groups tend to suffer. Refresher trainings in farming and business management would equip the women to be better practitioners in these fields. Involvement of local people especially in project design would instil a sense of ownership among community members. Finally a few women highlighted that more women need to be sensitised so that they broaden the benefits of conservation farming.

Although not directly related to the topic conservation farming, the recommendations to Africare confirmed the literature review on the need to involve the beneficiaries to enhance ownership, more education and sensitisation on the techniques for sustained adoption. "*The process in which information gathering, learning and experience play a pivotal role especially in the early stages of adoption*" states Jabbar et al, (1998). That education and sensitisation is not a one off event but a continuous process. Studies in Ethiopia showed that adoption is not a one off event but a process that begins with learning – adoption- continuous or discontinuous use of technology. Leadership and empowerment of women is also critical so that the adoption can be effective. Studies referenced in the literature state that women are more likely to adopt new farming technologies as they play a huge role in farming in Africa, Neil: 1998 quoted by (Sanders et al 1996). Reviews show that women are harder working than men and are also more likely to use the money to look after the family. This makes it more important for them to be adequately empowered.

Generally, in terms of how rural women can ensure food security, the following recommendations were given in order of importance: engage in gardening (32%); apply good farming methods like conservation farming, crop diversification, and early planting (24%); start businesses for income generation (24%) and engage in poultry production (12%). The graph below illustrates these recommendations.

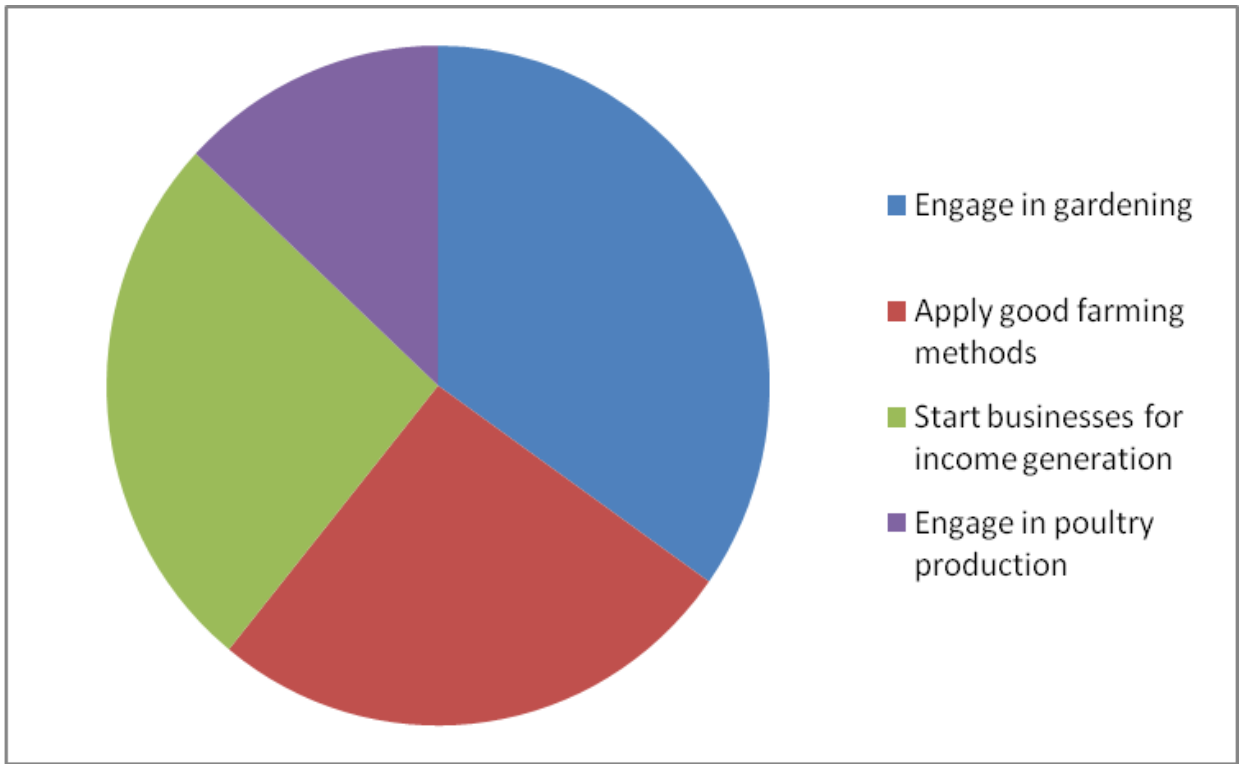

Figure 13: Recommendations on how rural women can ensure food security

4.7 Conclusion

Most women (85%) under the CABSCORM program use conservation farming method as compared to those who used conventional farming (15%). The average quantity of land cultivated per respondent was between 2-4 limas. While some women used ox-drawn implements the majority used hand tools or both methods. Though at planting time the ratio of female to male is almost 1:1 but at weeding and harvesting women representation surpass that of men by 20%. Conservation Farming practices used were potholing and ripping. In addition, farming practices such as crop diversification, maize monoculture, mixed farming and crop rotation were also by women farmers in Mpima. The crops they grew were maize, sweet potatoes, soya beans, sunflower, cowpeas, beans and groundnuts.

Farming is the main source of household income and crops sold included cotton, groundnuts, sweet potatoes, soya beans, sunflower, beans, cassava and maize. It was also indicated that among the 81% who sell their produce, only 36% remain with enough produce for consumption while 64% do not. Hence some of the money realised from the sales is used for buying more food and inputs whereas some use it for buying home requirements like groceries and clothes, paying medical fees and hired labour, and re-investing in other profit-making ventures like poultry production.

The majority of the respondents, constituting 78% of the total, grew specific crops for their own consumption. The crops grown for consumption, in order of importance, are: beans, maize, sweet potatoes, groundnuts, cassava, sunflower, sorghum, and others like Soya beans, water melons and pumpkins.

In terms of difference in well-being almost two-thirds of interviewees indicated that they had experienced a difference in their well-being since they joined the Africare women groups. This was an indication of betterment of life as a result of income increase, investments and savings. These can be attributed to the crop sales realised.

The major challenges women encounter in the agricultural sector were as follows: lack of inputs and implements, lack of enough land, drought and flood, and lack of capital for business. The key recommendations on how Africare can improve operations were the need to monitor and evaluate projects, empower women individually not as a group, and need to conduct refresher trainings. Additional general recommendations on how rural women can ensure food security were: engaging gardening; use of good farming methods like conservation farming, crop diversification, and early planting; starting businesses for income generation and engaging in poultry production.

The differences in income show that the adoption of new technologies plays a role in improving the level of income, this is attributed to increase in yields, which are seen as the result of timely land preparation and planting, this allows the crops to benefit from the favourable conditions at the onset of the planting season. This is also attributed to the ability of the women to implement the new technologies in farming; these technologies such as conservation farming can go a long way in the improvement of livelihoods in Mpima community, putting into consideration that 55% of the farmers experienced good returns from their land resource.

Therefore an increase in the individual house hold income means improved ability to take care of the orphans that are within the community. There is a ripple effect that can be observed by the improvement of the income levels; this all leads to an improvement in standards of living, for the women and their families, this change can be traced to improved farming systems.

CHAPTER FIVE

5.0 Conclusions and Recommendations

5.1 Introduction

This chapter summarizes the major findings of this study while on the other hand offers recommendations not only for future interventions but also research related to conservation farming as a drought mitigation measure or others in the related subject.

5.2 Conclusions

Findings showed that conservation farming is indeed a good farming method shown by the number of women that have adopted it. Provision of education on conservation farming contributes to the success of adoption. Women's income has improved since they started using the new farming method. It is not clear whether conservation farming can mitigate drought because the community faced drought followed by floods during the period in question. Despite the two calamities some women still reported increased yields due to conservation farming. Most women practiced both conservation and conventional farming though the majority practiced the former. Partial adoption of conservation for most women is expected as this is a gradual process. As outlined in chapter two, partial adoption is common since farming is the main source of livelihood and food security, communities are usually reluctant to take risks by totally abandoning their old ways to adopt new ones Neil (1998). Cattle ownership is still very low among women which make conservation farming more attractive as it does not require ox-drawn farming. In chapter 2, cattle ownership and how this influences people to adopt conservation farming is discussed by Haggblade and Tembo (2003). The findings from the women do confirm other studies carried out, although it is clear that conservation farming does improve the socio-economic status of farmers the relationship with drought is still not conclusive. Recommendations made by women are valid and should be used by Africare, other Nongovernmental organizations and government agencies.

The respondents also indicated that they had been empowered as women by Africare in the following areas: conservation farming methods, business management, HIV/AIDS information, crop diversification, food processing skills, and gardening skills. According to Neil (1998) in chapter two women are more receptive to new technology and are hard working. It has been proven that empowering women guarantees wellbeing for the entire family and community. Since the Mpima women have a social responsibility of looking after orphans within the community their empowerment will result in better care for the orphans.

Adoption of this technology for communal farmers complements their practices in agriculture, and together with the application of other drought mitigating strategies the community will succeed in their attempts to achieve food security. Several reasons can be attributed to the failure to observe detailed advantages of conservation farming owing to the weather phenomena that occurred during the course of the study, but the data collected from the women has evidenced a potential for the conservation farming system. As mentioned the discussion that there is also need to raise the awareness of complimentary decision making such as choice of varieties, choice crop to grow, and understanding of the weather patterns. There is lack of awareness in terms of the relationship between crops grown and weather phenomena.

In conclusion, lack of resources is a hindrance to progress in the agriculture sector. The Zambia Agriculture policy seeks to ensure that all farmers have access to implements and resources as described in chapter two. This was a significant contribution to the overall outcome of the study as the community had limited resources to use. Given that resources are available the women will stand a greater chance of ensuring food security at the household level when implementing conservation farming.

5.3 Recommendations

This study is making the following recommendations:

a) Recommending to the Ministry of Agriculture and Co-operatives (MACO) and other agricultural-based NGOs should look into the advantages of Conservation Farming looking at the social and economic appreciation as a result of Africare project in Mpima. Hence there is need to replicate this to many other areas.
b) Need for collaboration of all key players like DMMU, Meteorological Unit and farmers to mitigate the impact of farming-related disasters like droughts and floods which have an impact on conservation farming.
c) Government together with the private sector need to step up and implement intensive capacity building plans in conservation farming for farmers, especially women.
d) Monitoring and evaluation of the conservation farming project should be enshrined within each implementing agency rather than waiting for a Researcher to highlight the performances of such a project which could take years of implementation before checks and balances are put in place.
e) The empowering of women in the agricultural sector should be priority one by all primary stakeholders. The government should lead as an example is ensuring that the following are easily accessible by the womenfolk: inputs and implements; capital for business, and; land.
f) Africare should publicise this project through evaluations so that it can be replicated in other districts.

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APPENDICES

A1. QUESTIONNAIRE

Socio Economic Effects of Conservation Farming in Drought Mitigation Questionnaire

INFORMED CONSENT STATEMENT

Hello. My name is _____. I am a Research Assistant for Mrs. Kate Musimwa who worked for Africare from 2005 to 2008. I am conducting research on the Socio-economic effects of Conservation Farming in Drought Mitigation with particular interest in the Mpika Women groups under Africare. You have been randomly chosen to participate and I would very much appreciate your participation in this research. I would like to ask you questions about some important issues. The information you will give is for academic purposes only and will be kept in strict confidence.

May I begin the interview now?

Respondent Number _____

Name of Women Group: _____
Village:_____
Interview Date:__/___/____
dd mm yyyy

SECTION I: RESPONDENT INFORMATION

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	
1.	How old are you?		
2.	What is your marital status?	Single Married Divorced Separated Widowed	1 2 3 4 5
3.	What is your education status?	Not been to school Attained primary education Attained secondary education Attained tertiary education	1 2 3 4
4.	What is the size of your household?		
5.	How many AIDS Orphans do you look after?		

SECTION II: AFRICARE MEMBERSHIP INFORMATION

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES		SKIP
6.	When did your join the Africare Women group?	……		
7.	What was your main source of household income before joining Africare women group?	Farming only Farming and other business Farming and wage employment Others (Specify)…… ……	1 2 3	
8.	What type of assistance do you receive from Africare? **[MULTIPLE RESPONSES ARE ALLOWED]**	Seed Fertilizers Relief food Others (Specify)…… ……	1 2 3	
9.	Has there been any difference in terms of your well-being since you joined Africare women groups?	YES …….. NO ……..	1 2	 →Q.10
10.	How has been the difference in terms of the following:	Income…… …… …… …… Investments…… …… …… ……..... ..... Savings…… …… …… …… Others (specify)…… …… …… …… ……		

SECTION III: AGRICULTURAL PRODUCTION

11.	How much land do you cultivate? (specify if possible)	Less than a Lima 2 Limas 3-4 Limas More than 4 Limas		1 2 3 4	
12.	What type of crops do you grow and what are their proportions of the total production? **[MULTIPLE RESPONSES ARE ALLOWED]**	***Crop***	***Production size***		
		Maize			
		Sorghum			
		Groundnuts			
		Beans			
		Cassava			
		Sunflower			
		Others ……..			
		……			
		……			
13.	What cropping systems do you engage in? **[MULTIPLE RESPONSES ARE ALLOWED]**	Maize monoculture Mixed cropping Crop diversification Strip cropping Others (specify)…… ……		1 2 3 4	
14.	What cultivation practices do you engage in? **[MULTIPLE RESPONSES ARE ALLOWED]**	Conservation farming Conventional Ox tillage Others (specify)…… ……..		1 2	

15.	What are the seed varieties that you use? **[MULTIPLE RESPONSES ARE ALLOWED]**	Drought tolerant seed varieties Early maturing seed varieties Late maturing seed varieties Others (specify)…… …… ……	1 2 3	
16.	What type of implements do you use? **[MULTIPLE RESPONSES ARE ALLOWED]**	Ox-drawn implements Hand tools Others (specify)…… …….....	1 2	
17.	What kind of labour do you use when planting, weeding and harvesting? **[MULTIPLE RESPONSES ARE ALLOWED]**	Household labour Hired labour Others (specify)…… …… ……	1 2	
18.	What are the proportions in terms of Day's labour Involvement by Sex when:	***Activity*** / ***# Female*** / ***# Male*** Planting Weeding Harvesting		
19.	Do you also engage in livestock production?	YES …….. NO ……...	1 2	→Q.20
20.	What kind of livestock and how many per type do you rear? **[MULTIPLE RESPONSES ARE ALLOWED]**	***Livestock type*** / ***Number*** Pigs Cattle Goats Sheep Others…… …. ……. …….		

SECTION VI: FOOD SECURITY

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES				SKIP
21.	Do you sell any of your produce?	YES …….. NO ……...			1 2	 →Q.24
22.	How much produce did you sell in the last three seasons?	***Season***	***Type of produce***	***Amount (ZMK)***		
		2007/2008				
		2006/2007				
		2005/2006				
23.	What do you use the money you realize from what you sell?	Buying food Buying inputs Others (specify)…… …… ……			1 2	
24.	After your sales, is the remaining produce enough to feed the family until the next farming season?	YES …….. NO ……...			1 2	
25.	Do you grow any crops specifically for your own consumption?	YES …….. NO ……...			1 2	 →Q.26
26.	What crops do you grow for your consumption? **[MULTIPLE RESPONSES ARE ALLOWED]**	Maize Sorghum Beans Others (specify)…… …… ……..			1 2 3	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES		SKIP
27.	Did you have enough produce for your consumption in the last three seasons? **[MULTIPLE RESPONSES ARE ALLOWED]**	2007/2008…… Yes No 2006/2007…… Yes No 2005/2006…… Yes No	1 2 1 2 1 2	
28.	Do you adopt any strategy to ensure food security with respect to the drought conditions experienced of late?	Yes No	1 2	
29.	What are the specific strategies you have adopted from Africare in order to attain food security?	…… …… …… …… …… …… …… …… …… ……		
30.	How have you been empowered as a woman by Africare?	…… …… …… …… …… …… …… …… …… ……		
31.	How can Africare improve in their operations?	…… …… …… …… …… …… …… …… ……		

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES		SKIP
32.	How can rural women help in ensuring household food security?	…… …… …… …… …… …… …… …… ……		
33.	Have you received technical support from Africare?	…… …… …… …… …… …… …… …… …… ……		
34.	What problems do women encounter in the agricultural sector?	…… …… …… …… …… …… …… ……		
35.	How has drought affected your produce in the past?	…… …… …… …… …… …… ……		
36.	Are the effects of drought been the same since you started practicing conservation farming?	…… …… …… …… …… …… ……		

THANK YOU FOR YOUR TIME AND COOPERATION!

A2. FOCUS GROUP DISCUSSION

INTERVIEW SCHEDULE FOR A FOCUS GROUP DISCUSSION ON AFRICARE CONSERVATION FARMING PROJECTS IN MPIMA AREA

Target Group: Women group leaders (2 leaders per group by 6 groups)

1. When were the Africare Conservation Farming projects in Mpima initiated?
2. What were the objectives of the projects?
3. What is the total membership of the six women groups practicing Conservation Farming?
4. What types of farming methods were used and the kind of crops grown before Conservation Farming was introduced?
5. Do the women own cattle? If not how long did they have to wait to borrow?
6. What type of farming practices and crops do you practice and grow, respectively?
7. What type of agriculture information is provided to you as women groups?
8. From the time Conservation Farming projects were initiated what changes have you noticed in the following: Harvest? Food security? Incomes?
9. How has been the performance of the women groups since they were initiated? What reasons can be attributed to this performance?
10. Are you practicing Conservation farming in all fields or some?
11. Did all the women accept conservation farming at the same time?
12. What problems, if any do you encounter as women groups?
13. What future plans do you have for the women groups?

A3. INTERVIEW GUIDE

INTERVIEW GUIDE ON AFRICARE CONSERVATION FARMING PROJECTS IN MPIMA AREA

Target Group: Africare District Facilitator

1. When were the Africare Conservation Farming projects in Mpima initiated?
2. What were the objectives of the projects?
3. Who funds the projects?
4. Before you introduced the projects what type of farming was done and what were the kinds of crops grown?
5. What type of farming practices and crops do you encourage farmers to practice and grow, respectively?
6. Do you offer any marketing system for the surplus produce? If yes, how is it organized?
7. What type of credit facilities do you give to your women farmers? What are the reasons for giving this particular type?
8. Do you provide any type of agriculture information to the women farmers? If you do, what is the nature of the information?
9. From the initiation of the projects what changes have you noticed in the agriculture system of Mpima area?
10. How has been the performance of the women groups? What reasons can be attributed to this performance?
11. What are the major problems you encounter during the implementation of the projects? If any, how have you devised to tackle them?
12. What are the future plans in your projects particularly concerning women farmer groups?