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Adoption of the “Conservation Farming” practice in Maize Production by Small holder Farmers in the Makoni District of Zimbabwe

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Dedications

I dedicate this research report to my son Kuziva Chris.

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Abbreviations/Acronyms

AIDS	Acquired Immune Deficiency Syndrome
AGRITEX	Department of Agricultural Technical and Extension Services
CF	Conservation Farming
FACT	Family Aids Caring Trust
FAO	Food and Agriculture Organisation of the United Nations
FFS	Farmer field school approach
FGD	Focus Group Discussion
GMB	Grain Marketing Board
HIV	Human Immune Deficiency Virus
NGO	Non-Governmental Organisation
PRA	Participatory Rural Appraisal

Abstract

The research is about the adoption of “conservation farming” practice in maize production by small holder farmers of Makoni District in Zimbabwe as recommended by GOAL Zimbabwe. GOAL Zimbabwe is a Non-Governmental Organisation working in three provinces namely Harare, Manicaland and Mashonaland West provinces. The organisation works in relief and development work in the agriculture, health and education sectors. In 2004 GOAL Zimbabwe started to promote “conservation farming (CF)” in maize production in Makoni district. After eight years less than 30% of the targeted 27 000 targeted smallholder farming households have adopted CF in maize production as recommended by GOAL Zimbabwe. However GOAL Zimbabwe does not really understand the real reasons for this low adoption and the reasons for non adoption of CF practice in maize production.

The objective of this research is to find out the reasons why the targeted farmers did or did not adopt the recommended CF in maize production. In order to achieve the objective the following research questions were formulated: 1. Why are farmers willing or not willing to use “conservation farming” practice in maize production? 2. What knowledge on “conservation farming” practice do farmers have? 3. Which skills and resources enable farmers to use “conservation farming” practice in maize production? 4. Which farming methods are allowed in the area?

Two Focus Group discussions, interviews with individual farmers and with extension agents in one randomly selected village were used to answer the four mentioned questions.

For the selection of the farmers and the focus group discussions four categories of farmers were distinguished as: 1. Adopting with support from GOAL Zimbabwe (participating), 2. Adopting without support (adopting), 3. Non-adopting without support (non-adopting) and 4. Non adopting with support (defaulting)

One focus group consisted of category 1 and 2 whilst the other focus group consisted of category 3 only. Category 4 is very difficult to find and was not included in the research.

The twelve farmers interviewed individually were selected from categories 1, 2 and 3.

A Lead farmer, a Ministry of Agriculture village extension worker and a field worker from GOAL Zimbabwe were the three key informants interviewed as these have a leading role in the implementation of the CF project.

The outcomes of the focus group discussions and the interviews yielded the following results:

The most frequently mentioned reasons for non-adoption of CF are:

1. It is hard work throughout the year taking up time for other non-agricultural activities and increasing the workload on women who do much of the winter weeding.
2. Surplus maize produced is not profitable on the market compared to tobacco.
3. Benefits take long to be realised especially on unfenced fields where the benefits of mulch are interrupted by crop residue removal during the dry season.

Participating farmers in the project promoted by GOAL Zimbabwe and those not in the project who have fully adopted CF mentioned the reasons for adoption as:

1. Increased maize productivity as a result of early planting and other high crop management practices in addition to the improved soil fertility which reduced witch weed infestation and improved water use efficiency.
2. Saving of agricultural inputs which are expensive for example none use of inorganic basal fertilizer and the use of topdressing fertilizer to maximise yield.
3. Social belonging to a CF group has created avenues to venture into other income generating activities, like chicken production.

Based on these results/findings the study concludes that some participating farmers are motivated to use CF in maize production with the provision of inputs from GOAL Zimbabwe. Other participating farmers together with adopting farmers have managed to have adequate food from own production and have attained food security over time which is a motivating factor. Their mindset has changed and their needs of food availability have been met by the reliable yields that they have realized over the years. The reasons put forward by the non adopting farmers especially that of maize being unprofitable is not of value adopting farmers because their perceptions on the commercial side are different as non adopters value direct income from tobacco sales whilst the participating and adopting farmers value both food from own production as well as income from chicken production. Knowledge did not play any significant role in the adoption of CF as it was readily available to those in need of it.

Given the conclusions the study recommends GOAL Zimbabwe to promote CF without the input incentives so as to remove the external motivation which is not sustainable and promote internal motivation by convincing farmers of the benefits of CF. Farmers with livestock need to be included in the project by promoting mechanised CF to them. Mechanised CF is when implements like ox drawn direct seeders and Magoye ripper which opens up planting furrows are used. Chicken production as an income generating project can be promoted in the case of surplus maize as feed. The income can then be used for fencing the CF fields in order to get the full benefit of the CF practice. Stakeholders in the maize value chain and those in the agriculture sector can be facilitated by GOAL Zimbabwe to participate in various aspects of CF. GOAL Zimbabwe is recommended to take one role of either relief or development in order to achieve specific objectives and ensure sustainability of development projects.

Chapter 1: Introduction

1. Introduction

This report is about a research into **Adoption of “Conservation Farming” practice in Maize Production by Smallholder Farmers in Makoni District of Zimbabwe**. “Conservation Farming(CF)” practice has been promoted by GOAL Zimbabwe since 2004. The adoption rate among the targeted smallholder farmers was in 2011 about 30 %. The research described in this report aims to find out the reasons for adoption and non-adoption of CF practice in maize production. The research questions are: 1. Why are farmers willing or not willing to use “conservation farming” practice in maize production? 2. What knowledge on “conservation farming” practice do farmers have? 3. Which skills and resources enable farmers to use “conservation farming” practice in maize production? 4. Which farming methods are allowed in the area? To find answers on the research questions interviews with twelve farmers (male and female), project personnel and resource persons were conducted. Two focus group discussions were also conducted to get varied viewpoints on CF practice from adopting and non-adopting farmers.

Structure of the report

This report is organised as follows; Chapter 2 gives background information on CF practice, maize production by smallholder farmers in Makoni District, GOAL Zimbabwe and a short introduction on concepts of adoption. Chapter 3 gives the research problem definition. Chapter 4 gives the adoption theories, the conceptual framework and the adoption dimensions. The main research objective, the main research question, the sub research questions and the operationalisation of adoption dimensions are given in Chapter 5. Chapter 6 gives the research strategy and methods of data collection and processing. Chapter 7 gives the findings of the research. Discussion of findings towards results is given in Chapter 8. Chapter 9 draws conclusions and gives recommendations to GOAL Zimbabwe.

Chapter 2: Background Information on research topic

2.1 Conservation Farming

This research focuses on adoption of conservation farming (CF) in maize production in Makoni district of Zimbabwe. In this research CF refers to the practices of using planting basins, the use of manure and composts as basal dressing in the planting basins and mulching (soil cover). CF is thus a part of conservation agriculture as the other principles of conservation agriculture are not being precisely carried out. These other principles are; mixing and rotating crops, timely implementation of farming operations, precise operations done completely and efficient use of inputs as they are beyond the capacities of some of the small holder farmers. CF has been promoted by relief and development agents in an attempt to ensure that food is available at household level. Hove, et al. (2011) highlighted that CF has been tested and promoted as one of the interventions for addressing the prevalent problems of food insecurity, environmental degradation and poverty among the region's rural communities. The promotions began in 2003 aimed at bringing Zimbabwe out of the food deficit zone which was made worse by the 2002 drought and the changing rainfall patterns. CF is regarded as a medium term strategy to achieve increased yields and ensure food availability at household level. Benefits such as increase in yield, reduced soil erosion and improved soil fertility have been noted by the farmers using the farming method (Twomlow, et al. 2006).

Planting basins are holes dug in a weed-free field by use of a hand-hoe or a pick if the soil is hard into which a crop is planted. Planting basins are prepared in the dry season from July to October. Planting basins for maize production are 15cm length by 15cm width by 15cm depth in a permanent planting grid of 0.9metres by 0.6metres on an area equivalent to 0.25hectares. After the preparation of basins compost is mixed with the soil in the basin before planting as shown in Figure 1. The mulch consist of crop residues in the case of fenced fields and where fencing is absent the farmers cut grass and put it on the inter row space during the growing season.

Figure 1: Planting basins with manure



2.2 Maize Production by Smallholder farmers in Makoni district in Zimbabwe

In the post-independence period from 1980 small holder farmers have been using conventional farming where an ox-drawn plough is used to turn over the soil before planting. The use of inorganic fertilizers in the form of basal and topdressing increased in this era leading to an increase in maize productivity. After a decade of success the country faced reduced crop productivity due to the land policy reforms and economic crisis. Farmers without draught power are the most affected because they have to wait to have their land ploughed and thus losing on the benefits of the first effective rains. Other factors leading to reduced maize yields are soil erosion and decline in soil fertility. FAO and development organisations have provided crop input packages to a selected category of farmers using CF in crop production with emphasis on maize as the staple crop.

Makoni district

Zimbabwe's economy is agro based and is dependent on field crop production and livestock production in Natural regions II and III as shown in Figure 2. The agro-ecological zones are based on effective rainfall as rain fed agriculture accounts for an estimated 75% of the countries' agricultural production.

The research was carried out in Ward 12 of Makoni District in Manicaland Province shown in Figure 3. The district has approximately an area of 8 000 square kilometres with a population of 272 000 and 55 500 households (CSO, 2002). The district falls under agro-ecological region IIB which is characterised by rainfall of between 750 to 1000 millimetres per year and a mean annual temperature of 25 degrees Celsius.

Farming is the main livelihood of smallholder farmers which is defined by Ellis (2000) as "the activities, the assets and the access that jointly determine the living gained by an individual or household." Livelihoods are shaped by different factors which are constantly changing resulting in livelihood outcomes that households seek to be equally affected by the changing environment. A livelihood in this research refers to the ways in which a household makes ends meet from one harvest to the next. Makoni district is one of the major maize producing districts in Zimbabwe due to the favourable weather of agro-ecological zone IIB which it experiences and the loamy sand soils that it has. Most households in Makoni district rely on their own production to access maize for 80 per cent of the consumption year. A general decline in maize productivity has been experienced and this has been as a result of poor access to agricultural inputs by the resource constrained smallholder farmers, low soil fertility and erratic rains.

Governments, United Nations agencies, corporations and Non-Governmental Organisations in sub-Saharan Africa are trying to convince farmers to adopt CF to improve their crop productivity and conserve soil and water (FAO 2001, Giller, Witter, Corbeels, and Tittonell 2009, Haggblade and Tembo 2004, Mazvimavi and Twomlow 2009). Despite these efforts, adoption levels are low in Southern Africa with less than 1% of arable land under conservation agriculture (Hove, et al. 2011). These development agents have promoted CF as a form of relief aid as most of the small holder farmers could not afford farming inputs which were expensive and not available on the local market.

The national maize production in 2010 was estimated by FAO (CFSAM, 2010) at 1, 35 million tonnes, and an increase of 7 % over the preceding year. Manicaland province contributed 15 % of the national production and Makoni district contributes more than 40 % of the provincial total (AGRITEX Makoni). Small holder farmers constitute more than 70 % of the maize produced in the district.

Table 1 shows the institutions that are important for ensuring food security in Makoni district where CF practice is being promoted by GOAL Zimbabwe to ensure food availability at household level.

Table 1: Institutions important for food security in Makoni District

Name of organisation	Activities	Role
Department of AGRITEX	Provision of extension services	Provide technical advice on the farming system
GMB	Marketing of grains	Buy grain crop from farmers Sell grain crops to traders and consumers
GOAL Zimbabwe	Input support Training and extension support	Provision of agriculture inputs to project participants Training farmers in the use of conservation planting basins Provision of extension support on farming activities.
FACT	HIV/AIDS	Material and psychological support to families affected and infected by HIV/AIDS Sensitize farmers on the impact of HIV/AIDS on the farming system
Agro-dealers	Agricultural input suppliers Traders	Sell agricultural inputs to farmers and buy some agricultural produce
Financial institutions	Financial services	Source of financial capital for farming enterprises.

Figure 2: Map of Agro-ecological Zones in Zimbabwe

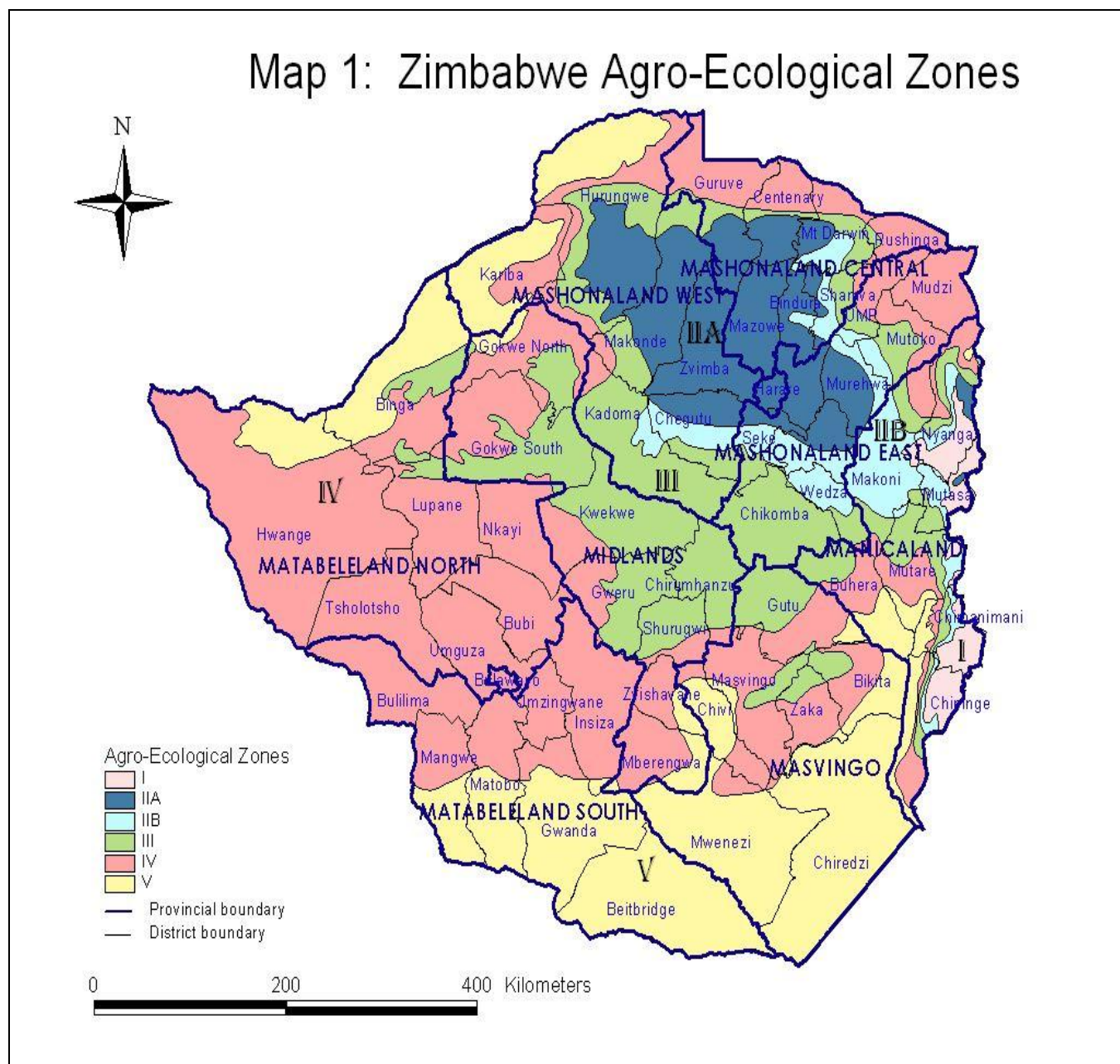
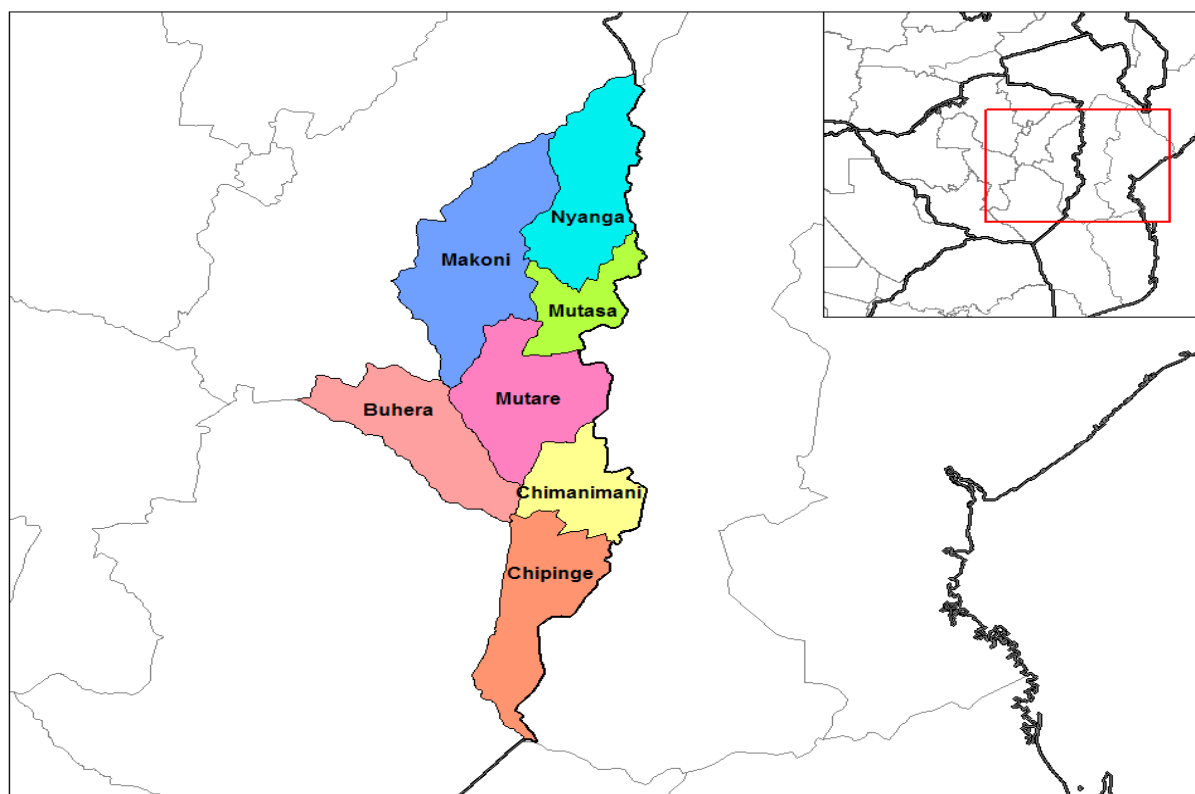


Figure 3: Map of Makoni District of Manicaland Province



2.3 GOAL Zimbabwe

GOAL is an Ireland based international humanitarian agency dedicated to alleviating the suffering of the poorest of the poor. GOAL's mission is to "work towards ensuring that the most vulnerable in our world and those affected by humanitarian crisis have access to fundamental needs and rights of life such as food, shelter, medical attention and literacy" (GOAL, 2012). GOAL Zimbabwe started operations in Zimbabwe in 2002 as a response to the 2001/2002 drought and the growing humanitarian crisis in the country. GOAL Zimbabwe operates in three provinces namely Harare, Manicaland and Mashonaland West provinces. Over time, GOAL Zimbabwe has broadened its programming from relief to recovery and developmental projects which are mainly classified four categories as; agriculture livelihoods and food security, healthcare and nutrition, water and sanitation as well as education. GOAL Zimbabwe works in collaboration with government line ministries as the organisation complements them in order to achieve its goals of providing the fundamental needs and rights of life to vulnerable people. The livelihoods and food security unit works closely with the Department of Technical and Extension Services (AGRITEX), the rural district councils, local leaders and established farmer groups for all the project activities in the communities.

An average staffing of 200 personnel depending on running programmes is estimated for the three provinces of operation. In Makoni district of Manicaland province GOAL Zimbabwe's Livelihoods and food security unit is implementing projects on CF in 13 out of the 25 communal farming wards. One field worker coordinates activities in one ward. The field workers visit farmers at least three times a week. Farmers are organised into groups for coordination of activities and trainings which are done

by a trained lead farmer. The target group approach is being used by GOAL Zimbabwe as CF information is provided to a selected group of resource constrained farmers especially those without draught power in order to achieve a shared goal of increasing maize productivity.

2.4 Adoption

According to extension literature adoption hangs together with four conditions namely; the farmer must want to, know how to, be able to and be allowed to follow the requirements of the farming practice being promoted (Leeuwis et al, 2004). The decision to take up a farming practice is determined by willingness which is the balance between claims and benefits of the new innovation in relation to the old system of farming. The knowledge required to carry out the new practice need to be available to the farmers. Ability to practice an innovation is influenced by the skills involved and the availability of resources or inputs to carry out specific activities. The societal norms and values have a bearing on farming systems that are allowed in an area. The theoretical concepts are further elaborated in the chapter of conceptual framework.

Chapter 3: Research Problem

3.1 Research Problem definition

Conservation agriculture is claimed to be a panacea for the problems of poor agricultural productivity and soil degradation in Sub-Saharan Africa (Giller, et al., 2009). The same author highlights that conservation agriculture is actively promoted by international research and development organisations, with such strong advocacy that critical debate is stifled. Farmers practising CF have achieved yields that are 15 to 75% greater than their conventional methods according to Mazvimavi and Twomlow, (2007). This has been as a result of farmers preparing land early, spreading the limited farm labour and planting on time with respect to the effective planting rain. Mupangwa, et al. (2011) highlighted that, “the planting basins dug by hand in a grid of 0.9 m x 0.6 m spacing harvest rainwater and reduce surface runoff from cropping fields and increase crop yields substantially.”

Adoption is defined for the purposes of this research as the decision a household makes whether to use “conservation farming” practices in maize production or to use conventional farming. The first phase of the project supported 10 out of 150 households in a village and in the second phase an additional 20 households are being supported. The support is in two parts namely provision of inputs and extension support. The inputs given to farmers are 10 kilograms of maize seed and 100 kilograms of topdressing fertilizer as the composts cannot provide enough of the nitrogen requirements at flowering. Extension support is in the form of capacitating the AGRITEX workers and Lead farmers in CF training and providing literature on CF. The CF training content include marking permanent planting stations, digging the basins, compost making, fertilizer application, thinning and the use of mulch.

The number of farmers adopting CF range from 2 to 15 households per village hence low adoption refers to less than 50% of the households in the village not practising CF. In this case less than 33% of households are using the practice and GOAL Zimbabwe expected that after 8 years of promoting CF practice more than 50% could have taken up the practice as households are resource constrained and have no draught power.

Shortage of labour has been cited by many researchers in the use of CF as the major constraint to its adoption by farmers. Factors such as relocation by youths to urban areas, lack of farming tools, pressure of weed control and lack of technical information have been cited by Twomlow, et al. (2006). Goddard, et al. (2008) argues that farm management decisions which incorporate changes in the farming system needs a radical mental change which is willing to change.

GOAL Zimbabwe does not have information on why the use of CF has not been adopted. This is important as the development agency need to understand under which circumstances “diffusion” take place from the targeted farmers which adopted CF and the non-adopting. Agencies need to understand the circumstances in which they promote technologies to small holder farmers and be able to assess the effectiveness and impact of such technologies on the farming system. This research was aimed at finding out factors leading to adoption and non adoption of CF in maize production given the importance of having adequate maize from own production for household consumption.

Chapter 4: Conceptual Framework

4.1 Adoption theories

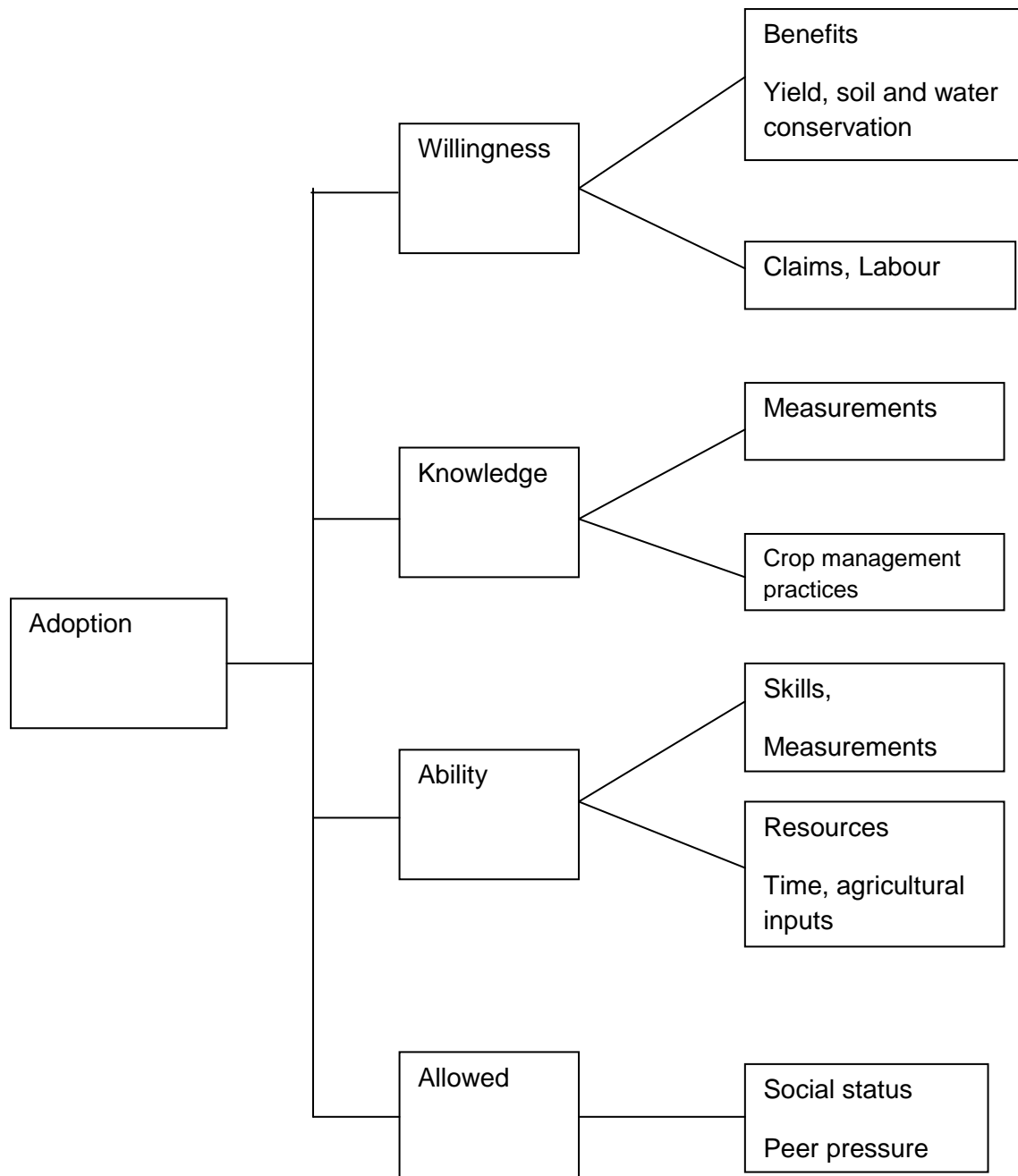
Roling and Kuiper (1994) as cited in Leeuwis et al, (2004) derived the variables which can help to explain farmer's practices that "what farmers (and other human beings) do or do not do depends on what they; believe to be true about the biophysical and social world (what they know), aspire to achieve (what they want), are able to do and are allowed and or expected to do." These variables point to some of the reasons that farmers have to the adoption or non-adoption of a recommended farming practice. Ploeg (1991) cited in Leeuwis et al, (2004) expresses that "farmers do not only consider possible technical consequences such as an increase in yield but also socio-economic effects such as required labour organisation and impact on social relations." These authors are highlighting the complexity of farming and techniques such as CF instead of conventional ploughing as these need to be carefully coordinated through decision making at household level.

Leeuwis et al, (2004) states that improving food production and fostering economic development is not just a matter of farmers receiving messages and adopting the right technologies, but has more to do with altering interdependencies and coordination between various actors. Technologies can be adapted to fit the context of farmers to ensure sustainability. Thus farmers have a wide array of factors to consider before they reach a point to take up certain behaviour. Van Woerkum(1999) as cited in Leeuwis et al,(2004) argues that in order to steer and direct human behaviour which is thought of as being largely predictable there is need to use communication as a policy instrument which leads to the sorting out of 'internally motivated' and 'externally motivated' behaviour as determined by the policies in place. The author identifies 'externally motivated' behaviour as originating from material and social circumstances or financial impulses whilst 'internally motivated' behaviour as arising from reasoned opinions that can be influenced by communicative intervention.

Farming is characterised by the high degree of coordination of activities such that a change in one domain like land preparation has 'ripple effects' on the other domains such as planting and weed management leading to the farmer dealing with multiple changes at any given time.

The adoption conceptual model's variables are used to help understand what farmers do and do not do at a given time. Willingness of farmers to adopt something is regarded as the net benefits attained after a new innovation is taken up in relation to the net claims of the old system. In this research the benefits of CF such as increased yield and soil and water conservation are weighed against its claims such as labour in comparison to conventional farming. Knowledge on the plant spacing dimensions and crop management practices used to assess the degree of adoption. Ability is determined by the required skills and the resources to carry out the activities. The social status of farmers and peer pressure are considered to yield to the farming practice allowed in the area. Figure 4 shows the dimensions of adoption as a concept.

Figure 4: Adoption Conceptual Framework



Adapted from Leeuwis et al, (2004: pg 65)

4.2 Adoption dimensions

4.2.1. Willingness

The decision to practise CF or conventional farming is determined by the perceived benefits and claims of each of the farming method. The advantages and disadvantages of the two farming systems are highlighted by Harford et al, (2009) in the FAO Guide to conservation Agriculture in Zimbabwe. GOAL Zimbabwe in its training of Lead farmers elaborates the benefits of CF in relation to conventional farming. The guide is the basic reference point for all the trainings as it has been translated into the vernacular for the farmers to use. The following points were picked up from a report of a training session.

Benefits of CF

Reduces soil erosion: Minimum soil disturbance occurs only where planting stations are made leading to minimal soil to be washed off by runoff. CF is being promoted because it conserves soil by reducing surface runoff as the soil is covered with mulch. Increased infiltration into the rooting zone is also made possible as rainwater collects in the basins. Farmers can plant with the first effective rain which is normally above 15mm and this maximise on the season length.

Conserves water: mulch protects the soil from runoff and erosion by providing a cushion for the impact of raindrops thereby allowing the water to infiltrate the soil. Evaporation is reduced by shading of the soil surface by mulching thereby availing soil moisture for use during crop growth.

Improves soil fertility: Soil fertility in exhausted lands is built up by covering the soil with mulch and applying organic matter amendments for example manure and composts as these increase the humus content. Soil cover increases the build-up of soil microorganisms which break down the mulch into humus. Macro organisms such as termites and worms burrow into the soil improving the soil structure in the process and enhancing water infiltration into the soil through the pores and tunnels. Good root formation and drainage is also achieved by the burrows and tunnels formed by the macro organisms (Harford, et al. 2009).

Saves on inputs: Farming inputs are conserved when farmers practise CF as smaller quantities of organic and inorganic fertilisers are placed in the root zone resulting in increased output per unit area. CF uses inputs efficiently because less of the inputs are used without wastage. Labour as a farming input is spread out over the season as basins are made during the autumn or winter seasons when the soil still have some moisture and soft to work using the hoe. Labour is also concentrated on a small area as a well managed small area can match the yield from a large area.

Proper weed management on a CF plot leads to reduced weed pressure with an increase in the years of practicing CF leading to reduced time and labour requirements for weeding. Additional benefits are realised on a fenced field as mulch on the soil surface from crop residues suppress weeds by blocking sunlight from them reducing their vigour and the cost of weeding is reduced. A hoe is less expensive compared to the ox-drawn mouldboard plough which requires constant maintenance due to wear and tear of parts. A person with a hoe is considered to be more accurate than a mechanical planter when sowing seed according to Oldreive (2009).

Better establishment and crop growth: Crop establishment and growth is relatively better under CF because of the high level of management practised during planting, thinning, mulching, fertilizer application, weeding and pest and disease control. Early planting with the first effective rains is made

possible as land preparation is carried out during the dry season and the crop benefits as it attains the heat units required for maturation quickly. CF maize fields are planted with extra seed as 3 seeds are sowed per planting station followed by thinning out of the poorly established seedling to leave 2 plants per station. Gap filling is not carried out enabling the crop to establish fast. Weeding before the weeds flower reduces competition on the crop and the growth of the crop is better. As mulching increases the availability of soil moisture in CF fields the crops grown in these fields are less susceptible to mid season dry spells which are a recurrent feature in Zimbabwe.

Higher yields: Higher yields have been realised under CF than on conventional farming as a result of early planting, more efficient use of rainfall, a better crop stand and precise application of fertilisers, manure or compost. This has proved to be the case in conditions of drought and of good rainfall according to Harford (2009). Higher yields mean increased food availability for home consumption and surplus produce can be sold where the income can be used to buy other dietary requirements. Thus practising CF has contributed significantly to food availability, access and utilisation through increased yields.

According to FAO (2011) report conservation agriculture forms the foundation for sustainable land management practices. This has been noted as Zimbabwe's agricultural productivity is undergoing recovery. Maize grain yield has increased from less than 1tonne per hectare to an average of 2 to 3 tonnes per hectare in the last 2 years. Thus CF being practised by smallholder farmers has a potential to resuscitate the agricultural sector and earn Zimbabwe her "breadbasket of Southern Africa" status. CF has the potential to increase agricultural productivity whilst simultaneously preserving the natural resources.

Claims of CF

High labour requirements: CF activities in the first seasons demands a lot of labour in the marking out of the precise planting stations, digging them out, weeding and preparation of mulch. On unfenced fields mulch management requires more labour.

Time consuming: Winter weeding takes the time for other non-farm activities and compost making takes a lot of time and requires regular attention. Benefits take a long time to be realised.

Benefits of conventional farming

Fine seedbed: Ploughing loosens the soil providing a fine tilth for seed germination by burying weeds and mix soil with fertilisers and manure in the process.

Pest and disease control: The complete turnover of the soil helps in the short term to control pests and diseases by burying them under the soil.

Claims of conventional farming

Soil and land degradation: Ploughing destroys the soil structure making it easier for soil to be washed away by runoff as the soil is left bare. The exposed soil surface leads to increased evaporation from the soil surface. When the soil structure is damaged by ploughing, the soil is more prone to compaction (Oldreive, 2009). Continued erosion leads to soil crusts which stop rainwater from

infiltration and lead to rill and gully erosion. Ploughing destroys many aerobic and anaerobic microorganisms through inversion as well as burying protective residues and mulch cover.

Delays planting: as farmers have to wait for the rains before they plough, leading to delayed planting and crops not maximising on season length.

Expensive: requires draught power which is difficult to access as more than 60 % of the households do not own cattle. Large quantities of organic matter are required per unit area as it is spread evenly in the field before ploughing.

Weed seeds: are buried at different levels allowing them to germinate in subsequent seasons when they are brought up to the surface again by subsequent ploughing. Some weed such as runner grass and are cut and are spread throughout the field.

Conventional farming in the communal areas of Zimbabwe is characterised by and inadequate soil, land and crop management techniques. This is so because the crop residues are either burnt or removed from the land to enable ploughing with oxen. During ploughing the soil structure is destroyed leading to the soil particles to be washed away by rainfall. Under conventional farming land preparation is of low standard, planting is often delayed as the land has to be ploughed first and crops are not well managed.

4.2.2. Knowledge

Knowledge of CF practice is a dimension which shows the depth of understanding that the farmers have in order to accept or reject a change in the farming system. CF practice requires detailed knowledge on why the three practices of minimal soil disturbance, use of organic matter and mulching are carried out. The researcher tackled the knowledge dimension from the farmer's point of view that is to find out what knowledge the farmers required in comparison with the knowledge supplied by GOAL Zimbabwe.

GOAL Zimbabwe's training report showed that the knowledge of CF on aspects of planting basins, mulching and compost making was supplied in the form of demonstrations on the farmers' fields during trainings and assistance was given during monitoring visits by lead farmers, AGRITEX workers and by the agency's field workers. The following activities were reported to have been carried out through demonstrations: marking out of the grid, placing the compost in basins, planting, thinning, mulching, split application of topdressing fertilizer, crop residue management and thermal compost making.

4.2.3. Ability

Shortage of labour has been cited as the major constraint to the adoption of conservation planting basins by farmers (Twomlow, et al., 2006). Haggblade, et al (2004) cited that conservation planting basins in Zambia for maize required a total of 223 person days per hectare per year compared with 110 person days per hectare per year for conventional ploughing. The researchers found out that returns to land was \$231 per hectare compared to \$1 per hectare for conventional ploughing. Increased labour productivity leads to increased yields which can improve food security and livelihoods. However the same researchers identified the returns to labour to be \$1.87 for basins compared to \$1.09 for conventional ploughing which meant that it is not profitable to use CF.

4.2.4. Allowed

The involvement of district food security stakeholders which include local leaders in the planning and implementation phases of the project ascertained the project to be allowed in the area. Social status and peer pressure have an effect on the behaviour of people and these aspects were discussed with respondents in this study.

Chapter 5: Research Objective and Research Questions

5.1 Research objective

To identify the factors leading to adoption and non adoption of “conservation farming” practice in maize production farming system by small holder farmers in Makoni District of Zimbabwe

Main research questions

What are the reasons for adoption and non adoption of “conservation farming” practice in maize production farming system of smallholder farmers in Makoni District?

5.2 Sub research questions

1. Why are farmers willing or not willing to use “conservation farming” practice in maize production?
2. What knowledge on “conservation farming” practice do farmers have?
3. Which skills and resources enable farmers to use “conservation farming” practice in maize production?
4. Which farming methods are allowed in the area?

5.3 Operationalising adoption

The development of interview questions was based on the four dimensions of adoption which formed the themes for the sub research questions as summarised in Table 2 below.

Table 2: Operationalising of adoption dimensions

Sub research question theme	Sub dimension	Indicator	Means of Verification
Willingness	Benefits	Increased yield, lower inputs use, improved soil fertility. improved water use efficiency	maize yield, maize production records, amount of fertilizers used maize productivity trend, selection criteria, comparison of growth of maize under CF and conventional, months of consuming maize from own production maize, most important livelihood activity, effect of CF on resources, lessons learnt from CF, discussions
	Claims	Labour requirement, time available for other non	Challenges of CF, activities carried out from one season to the other,

		agricultural activities	effect of CF on labour, time, resources and culture(Gender Analysis Matrix)discussions
Knowledge	Measurements	0.9x0.6m grid, 0.15x0.15x0.15m planting station, compost, mulch	Training reports, field observation, discussions, source of CF information, crop residue management, availability of compost
	Crop management practices	Basins, manuring, planting, thinning, mulching, fertilizer application, weeding, CF calendar	Training reports, field observation, discussions, source of CF information
Ability	Labour	Number of adults in household, other non agricultural activities	Discussion, effect of CF on labour, labour division within the household
	Resources	Time for other non agricultural activities, availability of planting lines, hoes	Discussion, effect of CF on resources, effect of CF on time, observation
	Skills	Ability to make planting stations at right angles(grid) Ability to make thermal compost, Ability to manage crop residues for mulch in the next season	Discussion, description, observation
Allowed	Social status	Confidence, self esteem	Motivation
	Peer influence	Belonging to CF group	Membership of CF group

Semi structured interview checklist were developed for the discussions mentioned under means of verification in Table 2 above. The checklist for Household interviews is shown in Annex1, Focus group discussion in Annex 2 and Key informants in Annex 3.

In this research a farmer who has adopted CF is one who has prepared at least 0.25hectares of land to grow maize using a grid of 0.9metres by 0.6metres. The basins are made in the fields and their dimensions are 0.15metres length by 0.15metres width by 0.15metres depth. The farmer uses composts as basal dressing in the planting stations and when the maize is growing the field is covered by either crop residues or grass to act as mulch.

Chapter 6: Research Strategy and Methods

The research was based on both primary and secondary data. Secondary data through desk research was done before going for fieldwork to collect primary data. Desk study was carried out on background information to the research topic and on adoption theories. The researcher gave the interviewees a verbal guarantee that the information that they provided in this research was confidential as it was being gathered for study purposes and their participation was voluntary. The researcher highlighted to the respondent that recommendations derived from findings and results are representative of the community and may be used by GOAL Zimbabwe for planning purposes.

6.1 The research strategy: The Case study strategy

Justification

A case study was used to gain a rich understanding of the context of this research and the processes taking place at the household level. The objective of the study was to identify the factors affecting adoption and non adoption of CF in Makoni district. The use of a case study in this exploratory study was aimed at gaining new insights and to ask adoption related questions with a broad perspective. This strategy helped to give answers to the questions why, what and how in relation to adoption and non adoption of CF. A rich understanding of the context of the research and the processes taking place at farmer level was gained by use of this strategy. A case study gives a comprehensive, integrated description of the essential feature of a case. Twelve cases in 3 farmer categories namely; project participating, adopting and non- adopting were studied. The reasons for using multiple cases was to establish whether the findings of the participating farmers are applicable to the adopting farmers and what factors hinder the non-adopting farmers from using CF.

6.2 Methods of data collection

Varied methods of data collection which included interviews, focus group discussions and observations were used in order to check for consistency of findings as triangulation of data increases validity and enrich the data. The use of multiple methods provided a better opportunity to evaluate the extent to which findings may be trusted and conclusions to be drawn from evidence or reasoning.

6.2.1 Interviews

Semi Structured Interviews with Households

One to one interviews with the 12 households in the three farmer categories were done with the aid of a semi structured interview questionnaire which is shown in Annex 1. The questions on the questionnaire were varied according to the category of the farmers being interviewed. The data collected from these interviews was used to reveal and understand the 'what' and the 'how' as well as placing more emphasis on exploring the 'why' of practising CF.

Pre-tests of the household interview were carried out to check whether research questions were being answered and the relevant adjustments were done in the interviews. The pretested households became part of the research sample as the researcher called back on them to get responses on the adjusted questionnaire. A qualitative interview in this regard helped to understand the reasons for decisions made by adopting and non adopting farmers and also the reasons for their attitudes and opinions. Semi structured in depth interviews provided an opportunity to probe

for answers from respondents to explain or build on their responses. Using of words or ideas lead discussions into areas that the researchers had not previously considered but were significant to address research objective. Semi structured interviews allowed the respondent to 'think aloud' about issues that are taken for granted thus allowing a rich collection of data. The researcher had more control over who answered the questions according to the specified categories and according to the research objective. Open ended questions were answered and the order and logic of questioning was varied according to the responses which were given during the interview.

Semi Structured Interviews with Key Informants

Three key informants who are actors in the delivery of the farming technique namely a Lead farmer coordinating the activities of project participating farmers as well as adopting farmers, GOAL Zimbabwe field worker and a village AGRITEX worker were interviewed to get their views on the factors affecting adoption and non adoption of CF. Secondary data on cropping records and training reports were accessed through key informants and were used to check on the productivity of maize under CF compared to conventional farming as well as checking on the knowledge that the farmers get through training. A checklist of the topics and guiding questions for each key informant was used as shown in Annex 3.

6.2.2 Focus Group Discussions

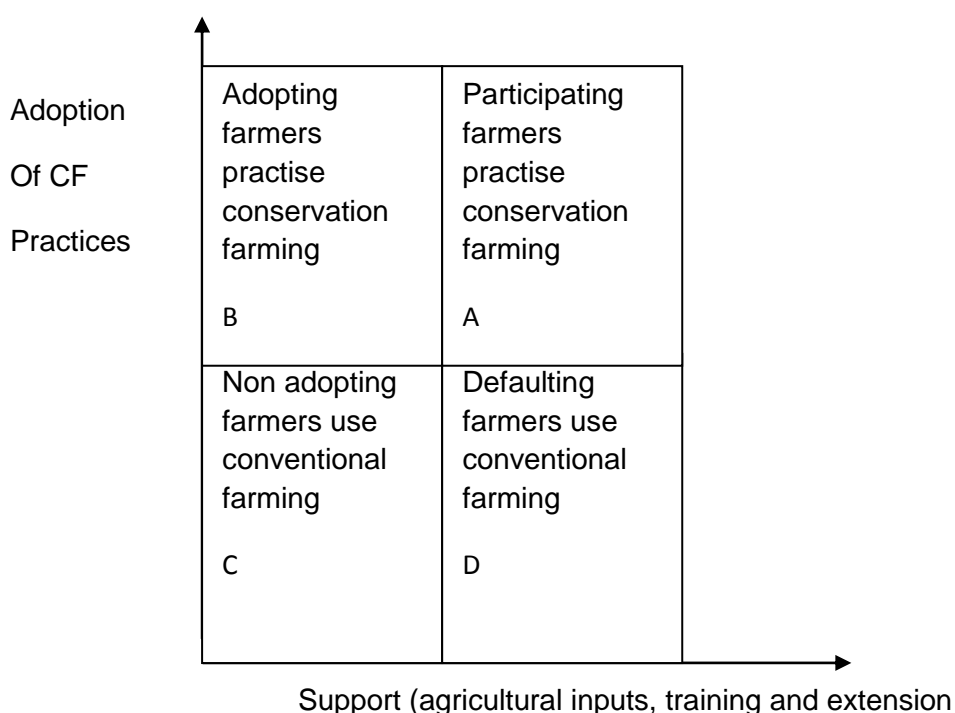
Focus group discussions were done to enhance various viewpoints to be shared by the group so that more information was brought up on the adoption and non adoption of CF beyond that shared from the household interviews. The topics for discussion were clearly and precisely defined and the discussion was guided with a focus to enabling and recording interactive discussion between participants. The village extension worker assisted in the identification of focus group participants who provided information to the research questions from the participating, adopting and non adopting categories. Two focus group discussions were conducted one for participating and adopting farmers with 5 men and 5 women and one for non adopting farmers with 4 men and 4 women.

A Participatory Rural Appraisal method was used to identify and rank the livelihood activities that households engage in to get food and income so as to determine the importance of CF to their livelihoods. A discussion on the farming method used to ensure food availability at household level was carried out so that the researcher would determine the weight of the claims and benefits of CF in relation to conventional farming according to the three farmer categories. The women in the focus groups included wives of male headed households as gender relations and the division of labour within a household was assessed by using another PRA method namely the Gender Analysis Matrix. The Gender Analysis Matrix was used to identify farmers' perceptions, elicit their criteria and understand their choices regarding labour, time, resources and culture on using CF and conventional farming. The discussants groups were organised by gender to incorporate the views of men and women separately then the groups came together to agree on their views. Semi structured interviewing was used to guide the discussions and to build on questions arising from the insights gained in the discussion (Pretty, et al. 1995). Semi structured interview questions used for focus group discussions are shown in annex 2.

6.3 Sampling

Random sampling of one village from the 18 villages in ward 12 was done to remove bias. A purposive sample of 12 households from three farmer categories namely participating A, adopting B and non-adopting farmers C were interviewed as shown in Figure 5. The research focused on three categories as the fourth category consisting of defaulting farmers D is made up of less than an estimated 2 percent of the targeted farmers and the time available for research was limiting to find respondents in this category.

Figure 5: Four categories of farmers in Makoni District



Purposive sampling

The information gathered from the non probability (non-random) sampling enable generalisation of theory on adoption of CF by smallholder farmers in Makoni District. The sample size of 12 households was determined by the need to identify factors affecting adoption of CF by participating, adopting and non adopting farmers. Purposive sampling with focus on in depth factors affecting resource constrained households that is those without livestock for draught power for conventional ploughing was done. This method was used because the sample size is small, individual cases are not difficult to identify as the village AGRITEX worker knows most of the households and the farming method that they are using. An in depth purposive sampling enhanced the purposes of the research which were exploratory and explanatory to be realised. The village AGRITEX worker's list was used to randomly pick the households within the participating and non adopting farmer categories. This was done by placing the numbers allocated to each household in a box which was shuffled and a number was picked at random. All four adopting farmers in this village were included in the sample.

Purposive sampling enables selection of cases that answer research questions and meet research objectives (Saunders, et al. 2007). Purposive sampling was used to obtain a homogenous sample across the 3 categories therefore households without draught power were selected and an in depth study of this sub-group was done. The cases selected in each of the three categories had a minimum number of differences for example households without livestock were selected that is selecting maximally similar cases. This was done in order to link up explanations on willingness, knowledge, ability and allowance in the data analysis.

Sampling of participants for the focus group discussions were sampled at random from the list of the AGRITEX worker from those that had not participated in the household interviews. The women in the focus groups included wives of male headed households as gender relations and the division of labour within a household was assessed using the Gender analysis Matrix.

Justification for using various methods

Table 3: Summary of Justification for using various methods

Data collection method	Study population	Sample size	Justification
Semi structured Interviews to 12 Households	Small holder farmers in ward 12	12 households in 1 village	In depth assessment of the decisions that households in the 3 categories have taken and to understand the reasons for their choices. Opportunity to probe interviewees to explain or build on their responses. Lead to discussions of issues unknown by researcher which helped to address research questions and objectives.
Key informant interviews	Lead farmer Village AGRITEX officer Goal Zimbabwe Project Officer	1 1 1	Experts to information on maize productivity and factors affecting use of a specific farming method to attain increased maize productivity
Focus group discussions	Small holder farmers in ward 12	2 groups representing adopting and non adopting farmers	Explore varied opinions from participating and adopting farmers in one group and non adopting farmers to practising CF and conventional farming. Allowed recording of the interactive discussion among participants

Limitations of the research

The researcher intended to interview an equal number of men and women in each category so that issues related to gender are noted but the sampled village had 3 adopting women and one man who were all included in the research. The researcher felt that a group of four adopters was too small for a focus group discussion such that the four members were part of the group of six participating farmers and they formed one focus group discussion. Instead of having 3 focus group discussions only 2 groups were interviewed namely one for participating and adopting farmers and one for non adopting farmers. The non-adopting farmers could not take off the previous field worker occupation from the researcher despite explanations that the data being collected was for research and was anonymous.

Chapter 7: Findings

Household interviews

Figure 6: Pretesting household semi structured interview



A total of 12 households were interviewed including those in the pretesting and 6 of the respondents were male and 6 were female. The size of the arable land ranged from 1 hectare to 3 hectares. The number of seasons that the participating farmers and adopting farmers had used CF ranged from 3 to 5 seasons. All the households interviewed used their own labour for CF practices and none hired labour to do the work. The non adopting households cited AGRITEX extension worker and friends as source of information if they decide to take up CF. Table 3 shows the summary of the findings from 3 pretested household interviews in relation to the research topics and Table 4 shows findings from 9 household interviews.

Focus group discussions

Figure 7: Free interaction during a FGD



Two focus groups, one consisting of 6 participating farmers and 4 adopting farmers and the other made up of 8 non adopting farmers held discussions which were guided by the semi structured interview questions as shown in Annex 2. Matrix ranking a PRA method was used to find out the most important livelihood activity which was identified as farming by the two groups. A Gender Analysis Matrix was developed by the focus group made up of participating and adopting farmers to determine the effect of CF on labour, resources, time and culture of women, men, households and community. The discussions were held at the training shed and there was free interaction between the participants and there were no interruptions. Table 5 gives a summary of findings from discussions held by the 2 groups.

Key Informant interviews

Interviews were conducted with key informants namely village AGRITEX worker, lead farmer and GOAL Zimbabwe field worker. Organisational reports were used to confirm maize productivity under CF. Interview settings for the lead farmer at her home enabled the researcher to understand the skills required for CF and some of the CF activities being carried out. The interview with GOAL Zimbabwe field worker was at the office and the conversation could be overheard reducing room for free interaction. Table 6 gives a summary of the findings of interviews with key informants.

Figure 8: AGRITEX worker Semi structured Interview



Table 4: Summary of findings for 3 pre-test household interviews

Topics related to household characteristics	Participating	Adopting	Non adopting
Sex	male	female	male
Labour units(ability)	2	3	2
Maize area under CF past season(ha)	0.4	0.25	0
1. CF Yield (t/ha)	2.5	3.6	0
2.Maize area under conventional past season(ha)	0	0.5	0.5
2.Yield (t/ha)conventional	Nil	0.8	1
3.Maize sold(tonnes)	0	0	0
Crops grown	Maize, groundnuts, sugar beans rapoko	Maize, soya bean, groundnuts, rapoko	Maize ,tobacco, groundnuts
Agricultural activities *Most important for the household	*Field crop production, vegetable production	*Field crop production, vegetable production	*Field crop production
Non agricultural activities	Tailoring	Nil	Building
Topics related to adoption 4. Meeting of selection criteria for the project:			

4.1 Willingness	Met	Met	Met
4.2.sufficient labour	Met	Met	Met
4.3 no cattle	Met	Met	Met
5,6,7,8. Knowledge of			
basins	Yes	Yes	No
planting	Yes	Yes	No
mulch	Yes	Yes	No
compost	Yes	Yes	No
thinning	Yes	Yes	No
fertilizer application	Yes	Yes	No
CF calendar	Yes	yes	No
9.Source of CF knowledge/information specified in 5,6,7,8	Lead farmers AGRITEX	Lead farmers, CF farmer group AGRITEX	Observation
10,11,12,14. Benefits of CF / conventional farming	Increased crop productivity, soil and water conservation, improved soil fertility, belongingness to CF group, low input technology	Increased crop productivity, soil and water conservation, improved soil fertility, belongingness to CF group	Draught power use is faster, Ploughing buries weeds, pests and diseases
13. Claims of CF/conventional farming	Present at the farm all year round, strenuous work, benefits realised after a long period	Time consuming, strenuous work, maize is unprofitable, mulch difficult on unfenced land, animal manure for compost	Destroys soil structure: land degradation, high fertilizer use ,delays planting, increase evaporation of soil moisture

Table 5: Summary of findings for 9 household interviews

Topics related to household characteristics	Participating 1	Participating 2	Participating 3	Adopting 1	Adopting 2	Adopting 3	Non adopting 1	Non adopting 2	Non adopting 3
Sex	male	female	female	female	female	male	male	female	male
Labour units(ability)	2	2	3	2	1	1	3	1	1
Maize area under CF past season(ha)	0.6	0.25	0.8	0.4	0.5	0.25	0	0	0
1.Yield (t/ha) CF	4.2	4.8	3.8	1.9	1.8	2.4	Nil	Nil	Nil
2.Maize area under conventional past season(ha)	0	0.5	0.5	0	0.5	0	1	0.5	0.5
2.Yield (t/ha)Conventional	Nil	0.3	0.2	Nil	0.5	Nil	0.75	0.5	0.4
3.Maize sold(tonnes)	1	0	1:Exchanged for labour	0	0	0	0	0	0
Crops grown	Maize, groundnuts, rapoko, soya beans	Maize, groundnuts	Maize, groundnuts, soya beans	Maize groundnuts, sunflower	Maize, sugar beans, rapoko	Maize, groundnuts , sugar beans	Maize, beans, tobacco	Maize, groundnuts	Maize, groundnuts
Agricultural activities * most important	Field crop production* Vegetable	Field crop production* Vegetable	Field crop production* Broiler	Field crop production* Vegetable	Field crop* production Vegetable	Field crop* production Vegetable	Field crop production* Vegetable and	Field crop production Casual	Field crop production Vegetable*

	production	production	production	production	production	production	fruit production	labour	production
Non agricultural activities	Pensioner building	pensioner	-	Petty trade	-	Petty trade	-	Firewood selling Barter trade*	Building Brick moulding
Topics related to adoption									
4. Meeting of selection criteria for the project:									
4.1 Willingness	Met	Met	Met	Met	Met	Met	Not Met	Met	Met
4.2.sufficient labour	Met	Met	Met	Met	Met	Met	Met	Not Met	Not Met
4.3 no cattle	Met	Met	Met	Met	Met	Met	Met	Met	Met
5,6,7,8. Knowledge of									
basins	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
planting	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
mulch	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
compost	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
thinning	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
fertilizer application	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
CF calendar	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No

9.Source of CF knowledge/information	Lead farmers AGRITEX relatives	Lead farmers AGRITEX	Lead farmers AGRITEX	Lead farmers AGRITEX relatives	Lead farmers AGRITEX	Lead farmers AGRITEX relatives	observation	observation	Observation
10,11,12,14.Benefits of CF/Conventional farming	Increased maize productivity, soil and water conservation, improved soil fertility, part of CF group, reduced witch weed infestation, low input use	Increased maize productivity, soil and water conservation, improved soil fertility, part of CF group, low input use	Increased maize productivity, soil and water conservation, improved soil fertility, part of CF group, reduced witch weed infestation, low input use	Increased maize productivity, soil and water conservation , improved soil fertility, part of CF group, low input	Increased maize productivity , soil and water conservatio n, improved soil fertility, part of CF group, low input use	Increased maize productivity , soil and water conservatio n, improved soil fertility, part of CF group, low input use	Land preparation is fast and is not strenuous. Time is available for other non-agricultural activities	Easier and land preparation with draught power.	Easier land preparation with draught power on rocky fields
13Claims of CF/conventional farming	Strenuous work , maize unprofitable	Strenuous work, mulching	Strenuous work, maize unprofitable	Strenuous work ,time consuming	Strenuous work, time consuming	Strenuous work, mulching	Draught power expensive hire	Land degradation , low yields,	Delayed planting, low yields

Table 6: Summary of findings for 2 focus group discussions

Topics related to household characteristics	Adopting	Non adopting
1.Livelihood activities	Field crop production, vegetable and fruit production, livestock production, formal employment, petty trade, barter exchange	Field crop production, vegetable and fruit production, livestock production, formal employment, petty trade, casual labour
2.Characteristics of households with adequate maize harvests and farming method	Farmers using CF, access to inputs, formal employment	Farmers using CF, access to inputs, formal employment, with livestock, with livestock manure
3. Characteristics of households with inadequate maize harvests and farming method	Farmers using conventional farming, poor access to inputs, poor soils, late planting	Farmers using conventional farming, poor access to inputs, chronically ill members, elderly, many household members
Topics related to adoption		
8.Benefits of CF/conventional farming	Increased yields - high crop management levels and early planting. Increased soil fertility, reduced soil erosion, reduced weed infestation, increased soil moisture retention, low inputs, belonging to social group(diversifying activities)	Faster and easier to use, helps to mix soil with fertilizers and manure, controls pest and diseases by burying them under the soil
9.Claims of CF/ conventional farming	Mulching unfenced fields is problematic, high labour requirements in the first seasons for marking out ,digging basins, weeding, farming activities time consuming as they are done throughout the year	Draught power required ;expensive to hire, delayed planting, land degradation, buries weed seeds, moves and spreads grasses such as runner grass in the whole field
10. Knowledge required for CF	Marking of planting stations, digging out basins, making of compost, application of manure ,planting with effective rains, thinning,	Readily available from friends, neighbours, AGRITEX Extension worker, lead farmer

	mulching, weeding, topdressing, crop residue management	
8.Determinants of ability to practise CF	Anyone is able to practise CF as the marking of planting stations is done with the help of CF group and material such as a book or brick can be used to make the grid. Skills can be acquired by observation even for those who are illiterate	Anyone is able to use CF if one is willing with ability to work and have a hoe.

Table 7: Summary of findings for 3 Key informant interviews

Checklist topics	Lead Farmer	AGRITEX worker	GOAL Zimbabwe field officer
1.Livelihood activities of households in ward 12	*Field crop production, vegetable production, formal employment, petty trade, casual labour	*Field crop production, vegetable and fruit production, livestock production, formal employment, petty trade, casual labour	*Field crop production, vegetable and fruit production, livestock production, formal employment, petty trade, casual labour, remittance
2.Income generating activities in Ward 12	*Cash crop, livestock rearing, petty trade, horticulture	*Cash crop, horticulture, casual labour, livestock rearing, apiculture, petty trade	*Cash crop, petty trade, livestock rearing, horticulture
3.Maize productivity past 3 seasons	Increase from 0.5t/ha to 5t/ha	Average yields for conventional farming have been 2007/8 0.4t/ha,2008/9 0.6t/ha, 2009/10 0.5t/ha, 2010/11 0.7t/ha, 2011/12 0.5t/ha.CF 2007/8 1.1t/ha,2008/9 1.3t/ha, 2009/10 1.5t/ha, 2010/11 1.8t/ha, 2011/12 2t/ha.	Average yields for CF 2007/8 1.2, 2008/9 1.4, 2009/10 1.5t/ha, 2010/11 2t/ha, 2011/12 2.2t/ha.
4.Maize yield gap for the 3 categories	Project participants are food self sufficient, adopting have less than 3 months of food shortage and non adopting have up to 9 months of food shortage	Participating farmers able to bridge food requirements from one season to the other, adopting farmers 3 months of food shortage, non adopting farmers more than 6 months of food shortage	Participating farmers able to bridge food requirements from one season to the other, adopting farmers 3months of food shortage, non adopting farmers dependent on food handouts 6-9 months of food shortage.
5.Benefits of CF	Increased yields, increased soil fertility, reduced soil erosion,	Increased yields due to high crop management levels and early	Increased yields, increased soil fertility, reduced soil erosion,

	increased soil moisture retention, early planting, low input expenditure as no hiring of draught power and purchase of inorganic fertilizers	planting. Increased soil fertility, reduced soil erosion, reduced witch weed infestation, increased soil moisture retention, early planting, low input expenditure as no hiring of draught power and purchase of inorganic fertilizers	reduced witch weed infestation, increased soil moisture retention, early planting, low input expenditure as no hiring of draught power and purchase of inorganic fertilizers, improved land management, efficient input use
6.Claims of CF	Mulching unfenced fields is problematic, high labour requirements in the first seasons for marking out ,digging basins, weeding, farming activities time consuming as they are done throughout the year	Mulching unfenced fields is problematic, high labour requirements in the first seasons for marking out ,digging basins, weeding, farming activities time consuming as they are done throughout the year	Mulching unfenced fields is problematic, high labour requirements in the first seasons for marking out and digging basins
7.Effect of CF on labour	High labour requirements	High labour requirements	High initial labour requirements
8.Effect of CF on time	Time consuming	Time consuming	Activities spread throughout the season
9.Effect of CF on resources	Low inputs used	Low inputs used	Improved management of natural resources, low inputs used
10.Effect of CF on culture	Social cohesion is enhanced	Social cohesion is enhanced, enhanced entrepreneurial skills	Social cohesion is enhanced, improved women participation in decision making, enhanced entrepreneurial skills
11.Challenges farmers share with Key Informants	Marking out of right angles for the planting station grid. Strenuous work to dig basins on rocky fields	Marking out of right angles for the planting station grid. Strenuous work to dig basins. Limited	Extra labour for safekeeping crop residue for mulch from in situ grazing by livestock. CF area not

		and compacted soil. Limited nitrogen source for making nutrient rich composts	nitrogen source for making nutrient rich composts	increasing as much work required. Limited nitrogen source for making nutrient rich composts
12.Recommendations for challenges		Use of ox-drawn direct seeders, jab planters.	Use of ox-drawn direct seeders, jab planters, integration of the livestock and agro forestry activities into the CF project. Extension worker demonstration plots accessible for all to learn. Advocate for FFS approach as extension method	Use of ox-drawn direct seeders, jab planters, integration of the livestock and tree farming activities into the CF project. Fencing of CF plots, use natural repellents chilli and cow dung to deter grazing
13. CF knowledge(crop management practices), skills and resources		Knowledge is available through discussions on the farmer's field, marking out and digging are done as demonstrations on fields, resources for compost and mulch available	Knowledge through discussions on the farmer's field, marking out and digging are done as demonstrations on fields, resources for compost and mulch available. Literature on CF in vernacular.	Knowledge is available through discussions on the farmer's field, marking out and digging is done as demonstrations on fields, resources for compost and mulch available. Literature and refresher courses.
14. Social status of the 3 categories of farmers.		Project participants have high self esteem as they have food at household level. Adopting farmers have self esteem as they are better off than non adopting farmers in food availability	Project participants have high self esteem as they have food at household level. Confident and convinced adopting farmers better off than indifferent non adopting farmers	Project participants have high self esteem as they have food at household level. Adopting farmers using own resources more confident, Non adopting farmers indifferent
15 Lessons learnt from CF		Participating farmers despite free input handouts have been convinced that CF increases yield	Non adopting farmers have been dependent on food handouts and are not willing to do strenuous	Increased maize productivity Adopting farmers are friends of participating farmers and lead

	on soil of low fertility with low input cost. Can be used by all social classes	work for maize despite being a food crop as it is unprofitable on the market	farmers and are happy to be part of the CF group
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Chapter 8: Discussion of findings towards results.

The results of the research are presented according to the adoption dimensions of willingness, knowledge, ability and allowed as was shown on the conceptual framework in Chapter 4.

8.1 Willingness

The motivation or aspirations of farmers to practise CF were assessed by weighing the benefits and claims of CF in relation to conventional farming.

Benefits of CF practices

Increased maize yield

The adopting farmers pointed out that the increased yield of maize was the major driver of CF. Increase in maize yield was as a result of early planting with the first effective rains as planting basins are prepared in the autumn and winter months of May to August. The maize established early and had a better growth as disease and pest incidences are lower earlier on in the season. Witch weed was suppressed by the continuous use of organic matter and the early planting. The other factor that contributed to increased productivity is the high level of crop management carried out on the CF field which included the use of organic matter as basal dressing and thinning out of maize crop to leave 2 plants per station. Weeding on CF maize was done early in order to reduce competition for nutrients, water and sunlight from occurring between crop and weeds.

Increased yields mean increased food availability for a household and a source of income when surplus is sold. From the study only one farmer sold (1tonne) surplus maize and the other exchanged (0.5 tonnes) for labour at harvesting. Surplus maize was being used as feed for poultry rearing as an income generating activity by the CF group in the study area which has diversified its group activities. This implies that GOAL Zimbabwe need to integrate programmes such as livestock, crop production and farmer market linkages. Adoption of CF can take place when maize can be used as fodder for other income generating projects. Figure 9 shows the average maize yields for the 3 farmer categories using findings from Table 5.

Figure 9: Average maize yields for the 3 Farmer categories

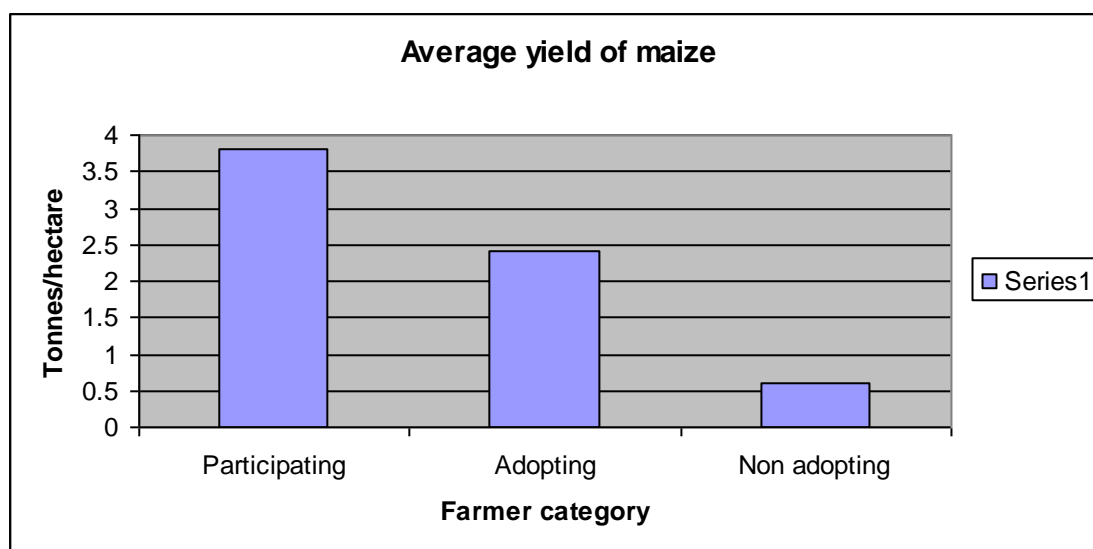
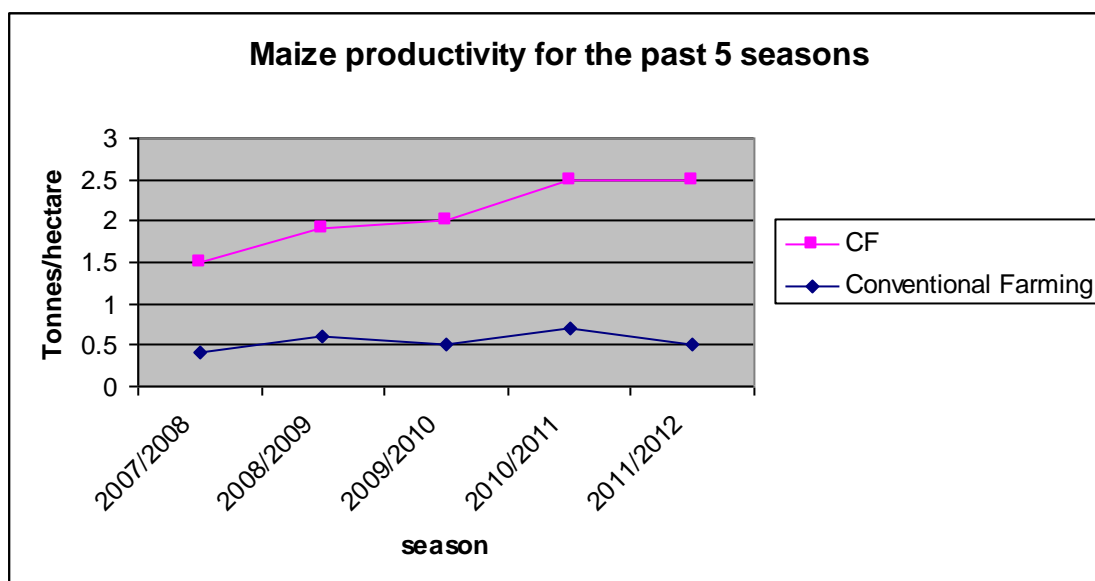


Figure 10: Maize cobs stored indoors



All the respondents in the three farmer categories devoted the largest area under cultivation to maize production which shows that they prioritise maize as the food crop of their preference and they go on to classify themselves into food secure and food insecure social statuses using the amount of maize grain reserves that a household has as shown in Figure 10. Participating and adopting farmers realised more reliable maize yields from CF which is proving to be more sustainable. CF maize and conventional maize productivity for the past 5 seasons is illustrated in Figure 11 using the data provided by AGRITEX as shown in Table 7.

Figure 11: Maize productivity trends over 5 seasons (AGRITEX records)



Maize yield gap for the three farmer categories was highlighted by the key informants where participating farmers have 12 months of maize grain from own production, 9 months for adopting farmers and less than 4 months for non adopting farmers.

Increased soil and water conservation

Participating and adopting farmers acknowledged that soil fertility is improved by CF as the organic amendments are concentrated in the same area over a period of time. This has also been noted to improve the availability of soil moisture and helps to suppress witch weed infestation. However the reduction in soil erosion was not highlighted by most respondents. A comparison of maize grown under conventional and CF was done and those practising were quick to point out that maize under CF is less susceptible to moisture stress due to mulching. Mulching reduces evaporation, increases infiltration and increases soil fertility as it is broken down by termites, worms and microorganisms. The use of mulch to smother weeds was not highlighted as all the respondents fields are not fenced and have a problem of getting more than 30% mulch to cover their plots throughout the cropping period. FAO (2008) points out that CF contributes to reduction of land degradation and improves a sustainable farming system which is important for sustainable land management.

Respondents did not realise the importance of CF on environmental issues such as a decrease in agro chemical contamination due to a reduced reliance on mineral fertilizer.

Saves on Inputs

Farmers practising CF are saving on inputs as resources used for hiring draught power such as money or exchange for labour are being used within the household. No expenses are incurred for the wear and tear of farming implements as a hoe is the major tool required under CF. Crop residues and animal manure are used to make organic matter used as basal dressing in the planting stations replacing the expensive inorganic compound fertilisers as shown in Figure 12. Low levels of topdressing fertilizers are used and are placed within the basin to ensure that no losses are incurred. These are used to supplement the high maize nitrogen requirement at flowering as their soils are sandy and for maize productivity to be increased there is need to apply Ammonium nitrate as topdressing fertilizer. However from the findings there was no indication of savings on labour as a farming input.

Figure 12: Adopting farmer's pit compost



Social grouping

CF has strengthened the social fabric in the research area between adopting and participating farmers because 2 out of the 4 adopting farmers are practising CF because they are friends of the Lead farmer. The CF group has diversified activities into other income generating activities such as commercial poultry keeping project using part of surplus grain produced under CF as feed for poultry. The group indicated that when they meet as a group they discuss and help each other on cross cutting issues such as HIV/AIDS and child protection. The self esteem attained in the social groupings and the sense of belongingness is an indicator of the success and potential sustainability of the project.

Claims of CF

Labour

Labour is the main resource required at the farming system in order to process all the inputs into outputs. Thus CF requires manual labour in the initial accurate marking out of planting stations and the digging out of the often compacted soils or rocky fields has resulted in labour being singled out as the major claim of CF. After the first season the planting basins are remade at the same position as the preceding year and the subsequent placement of basal dressing follows.

Farmers in the research sample did not note any reduction on the demand for labour as the CF activities take the whole year. These activities are winter weeding, storing crop residue and grass on raised platforms as shown in Figure 13 or fenced areas to prevent in situ grazing by livestock during the dry season as shown in Figure 14 and compost making. Weeding during the cropping season has been highlighted as requiring a lot of labour especially so for women because mulch is inadequate throughout the season to smother weeds. CF has shifted much of the work to women as they do much of the weeding especially the winter weeding and the cutting of grass for mulching during the growing season.

The female non adopting farmer pointed out that she could not practise CF due to shortage of labour as the other labour unit in the household (sister) is not well due to HIV/AIDS confirming the point of Toupozis, et al. (1999) that labour shortages compounded by HIV/AIDS occurring together with declining household income lead to food insecurity and livelihood insecurity. This was shown by the household indicating that she depends on barter trading of clothing for maize besides engaging in other income sources such as firewood selling and casual labour.

Gender Analysis Matrix

The focus group consisting of participating and adopting farmers made a Gender Analysis Matrix (Table 8) to show the effect of CF on labour, time, resources and culture of men, women, household and the community. CF maize production operations requires high levels of management which were noted in the record books of participating farmers whilst the adopting farmers were able to show the researcher some of the operations that they were carrying out at the time of the study such as compost making and winter weeding. The respondents were able to explain the activities and the reasons for carrying them out just as reported in GOAL Zimbabwe's training reports.

Increased workload for women was confirmed by the point that activities are carried out throughout the year with little idle time available for community politics as vegetable gardens are cultivated especially after field crop production to supplement food and for dietary reasons. A high proportion of tasks for food production are undertaken by women. The findings from the research area confirm this as 3 of the respondents from the adopting farmers category were women and one was male. Male headed households were either with livestock that is they fell outside the research study population or were none adopting. The adopting male respondent was a widower and an interpretation of him having taken up the food production task of women can be made. Mutangadura (2005) indicated that women play a major role in agricultural production and most of the activities are typically labour intensive.

Figure 13: Crop residue Management



Mulching

Using crop residue as mulch on unfenced areas requires extra work of storing the mulch on raised platforms as shown in Figure 13 away from being grazed by livestock in the dry season as shown in Figure 14 and placing it back to the field after planting.

Figure 14: Cattle feeding on crop residues



Table: 8 Gender Analysis Matrix: Use of CF in Maize production in comparison to conventional farming

	Labour	Time	Resources	Culture
Women	<p>-Increased workload as maize production systems require high levels of management.</p> <p>+New skills acquired</p>	<p>-More time required to carry out agricultural work throughout the year</p>	<p>+Increased maize productivity and potential increase in income with market linkages</p> <p>+Low use of expensive inorganic fertilizers</p>	<p>+Working together in groups to produce maize</p>
Men	<p>+New skills acquired in making permanent planting stations, thermal compost, use of mulch, thinning and fertilizer application and keeping the crop weed free</p>	<p>-More time required to carry out agricultural work throughout the year</p> <p>-Less time available for non agricultural work</p>	<p>+No expenses in buying spare parts of agricultural implements</p>	<p>+Working together in groups to produce maize</p>
Households	<p>+Men and women are more skilled in crop management</p>	<p>-Less time for childcare and household management</p>	<p>+No expenses in hiring draught power</p> <p>+Increased crop diversity as crop rotation</p>	<p>+Resource constrained households' status changing as they become food self sufficient</p>
Community	<p>+More skilled people in soil and water conservation</p>	<p>+Increased participation by women in maize production activities</p> <p>-less time for community politics for men, women</p>	<p>+ More food in the community</p> <p>+ Increased management of soil, water and land management</p>	<p>+Increased self esteem for resource constrained households</p> <p>+Increased social cohesion as women and men work together with a specific goal</p>

Time consuming

Farming activities during the cropping season require high management levels and those in the off season such as turning the composts are done on a regular basis and the farmer has to be on the farm at all the time. The results contrast with FAO (2010) on the issue of CF saving time as labour management was reported to be high and labour being spread throughout the year. The respondents expressed that CF is time consuming as it restricts women from doing other household and community roles especially at weeding when labour is at peak. The CF time management attribute is an area for further research.

Maize is unprofitable

CF is being promoted on maize a food crop which does not fetch a high price on the market. Thus 2 of the non adopting farmers in this research prefer to work on tobacco which also requires a lot of labour and its farming operations also takes a long time because they earn high income from tobacco and manage to buy the maize grain from those with surplus. These farmers have a commercial farming orientation as they prefer a cash crop under contract farming in comparison to a food crop as priority for their labour whilst the adopting farmers prefer a reliable source of a food crop through CF practice.

CF results are long term

CF results take more than 3 seasons to be fully realised .Below is a quote from one non adopting farmer to illustrate this point. *“One can grow thin from digging and can die before enjoying the benefits from CF. Those practising it do not know the real value of their labour as it is cheaper to buy maize than to produce it”.*

The research results show that non adopting farmers have weighed the benefits and claims of CF in comparison to conventional farming. The increased maize productivity as the major benefit of CF has been outweighed by the high labour requirements and the unprofitability of the maize so produced. These farmers have opted to go for tobacco production as a cash crop as it is profitable and they can afford to buy maize for home consumption.

8.2 Knowledge

The participating and adopting farmers interviewed had detailed knowledge on CF inputs requirements such as marking and digging out planting basins, making nutrient rich composts, planting and thinning out to recommended plant population, making weed seed free mulching material from grass and fertilizer application. They were able to describe in detail all the activities in the CF cropping calendar as shown in Table 9 and some of them showed the researcher activities that they are currently doing as shown in the pictures in the report.

Table 9: CF calendar

Farming activity	Time of operation
Post harvest weeding	May-August
Marking out basins and digging	September-October
Mulch/crop residue management	March-May
Apply manure/fertilizer	September –October
Planting	October-December
Thinning	November-December
Mulching	October –April
Weeding	October –April
Topdressing	December-February
Pest and disease control	November-April
Harvesting	March-May
Post harvest handling	March-August

Lead farmers, AGRITEX worker, other CF group members and observation are the sources of knowledge for participating and adopting farmers with GOAL Zimbabwe field workers playing a coordination role. Non-adopting farmers showed basic knowledge of CF that they had learnt from observation from their peers and from field days attended as these are learning platforms. No knowledge challenges were highlighted by key informants as they pointed out that knowledge is readily available through trainings and informally through peer discussions. Participating farmers had literature in vernacular and kept notebooks for reference whilst refresher courses are scheduled for extension agents and lead farmers.

8.3 Ability

Skills

Marking out of planting stations at precise points in the CF field is a skill which is required for accuracy as slope has to be considered for the orientation of the plant rows. Thus the lead farmer and the CF group are expected to work together at least in the first season when markings are done. The use of a book or brick has been adapted in this village for marking the right angled grid. Standard marker sticks are made and used together with the marked planting lines during land preparation. A bottle cap is used as the standard for topdressing fertiliser application.

Resources

Labour was considered as one parameter during selection of project participants by GOAL Zimbabwe at CF project implementation. The 4 participating farmers in the research sample met the selection criteria of having at least 2 labour units. Two of the four adopting farmers had 2 labour units and could not take part in the CF project because one was absent whilst the other could not participate as the number of participants required from their village had been reached. The other 2 adopting farmers have 1 labour unit each and could not participate in the project due to this limitation. This project selection requirement did not deter them from practising CF. Two out of the four non adopting farmers in the research sample have 2 labour units and are unwilling to practice CF because maize produced under CF is not profitable and they have decided to grow tobacco instead. GOAL Zimbabwe during selection of project participants emphasised on the ability of farmers to carry out CF by stipulating 2 labour units per household as the criteria for participating in the project. However this was strengthened for the adopting farmers by ensuring that the Lead farmer and farmers collectively carry out the initial stages of marking out and digging out planting stations together as a group.

The two focus group discussions concurred that anyone is able to practise CF because working in a group to do land preparation removed the limitation of inadequate labour units required during the initial phases of the project. A household with a hoe the main tool used for CF can make compost and mulch from crop residue.

CF activities are all year round and the non-adopting farmers have pointed out that they cannot manage to practice CF and growing tobacco at the same time as both require a lot of labour and time as well.

8.4 Allowed

Field crop production was identified as the most important livelihood activity of the research area whilst cash cropping was noted to be the most important income generating activity. Conventional ploughing, CF and digging are the land preparation methods allowed in the area in order to earn a livelihood. The social status of resource constrained households was changing for the participating and adopting farmers who have become food self-sufficient as a result of CF. Adopting farmers have benefited from peer pressure by practising CF because their peers are part of the CF group.

Participating farmers and adopting farmers were cheerful and were willing to show their record books, their maize stores and the activities that they are carrying out whilst non adopting farmers were not enthusiastic about their livelihood activities. The non adopting farmers respondents for the household interviews as well as the focus group did not like photographs to be taken during the interviews and the researcher obliged.

The activities of a farmer are influenced by household members, relatives, local leaders, neighbours and politicians among other actors. Burton (2004) highlights that the acceptance by a farmer to take up an innovation is significantly influenced by peer pressure from friends and neighbours and this can influence the decision to take up the innovation. CF practice has changed the cultural and traditional norms like burning of crop residues to ensure smooth movement of the ox drawn plough to crop residue management for the unfenced fields. This cultural change where crop residue is viewed as an asset has led to the high social status that the participating and adopting farmers have accorded themselves.

Chapter 9: Conclusions and Recommendations

9.1 Conclusions

Maize is the staple crop and is given the first priority when field crop production takes place at household level. The study showed that participating and adopting farmers are willing to use CF in maize production because of the increase in yield that they have benefited from. These two categories of farmers have managed to bridge the seasons with adequate amounts of maize as the major cereal for household consumption. Benefits such as soil and water conservation and increased soil fertility have been noted as secondary benefits. Farmers who had problems of witch weed infestations have had their problem addressed as the CF practices have suppressed the infestations. Social cohesion brought about by the CF groups working together has created a sense of belongingness and such groups are diversifying their activities into other profitable enterprises such as small livestock production. The researcher views this as a strength to the community as they have been empowered to organise themselves into functional groups with high participation of women.

Savings on inputs namely draught power and using organic manure for basal dressing mean that farmers who are resource constrained can afford to produce their own food and can no longer depend on food aid. CF can be used by vulnerable households who are dependent on agriculture for a livelihood and do not have a reliable source of income. The use of surplus maize as feed in small livestock production has opened up avenues for livelihoods diversity such as broiler production which is a profit maximising behaviour. It is also beneficial in that the diversified farm produce leads to a reduction in the purchase of supplementary food stuffs, providing a healthier diet and offering the possibility of integrating CF with other projects in the health sector.

Knowledge on CF is available at learning platforms such as field days and the trainings conducted by the lead farmers (farmer to farmer extension) in the group members fields which are viewed as an extension of the farmer field school approaches and are accessible to those who value the benefits of CF. The researcher noted that the farmers knowledge is mainly coming from the lead farmers who are trained by GOAL Zimbabwe with the AGRITEX workers complementing the efforts of the development agency by encouraging all farmers to adopt.

The ability to do CF is viewed in relation to the skills required which are basically measurements and planting basins digging, compost making and mulching are attainable by practice. Any farmer with a hoe and has been convinced by the benefits of increased productivity and resultant soil and water management benefits is able to practise CF. CF is a modified way of hand hoe tillage where the digging completely turns over the soil and is practised when draught power is not available. Thus the precise marking out of permanent planting stations is an advanced way of digging which has no practical implications on norms and values of rural communities in the study area meaning that it is allowed.

It has been noted that some project participating farmers have not been internally motivated to do CF as they place more emphasis on the free seed and fertilizer (carrot) provided by GOAL Zimbabwe. These work hard in order to be within the guidelines given by the organisation in terms of the activities carried out during the cropping calendar in order to refrain from the punishment (stick) which is not being given the free inputs.

High labour claims attached to CF have been highlighted by those who are not willing to take up the technology as those practising CF have resorted to mulch storage or fencing of fields as they have been enlightened by the long term benefits of CF. Some non-adopting farmers are producing tobacco as a cash crop as it is more profitable on the market in comparison to maize. The unwillingness of non-adopting farmers may be due to other factors such as being demotivated by not being given free inputs, political or religious which restrain them from working with people in a group.

The research was able to answer all the four sub research questions on the dimensions of adoption namely willingness, knowledge, ability and allowed. The researcher concludes that the factors leading to the adoption of CF by smallholder farmers in Makoni district is a decision of behaviour change reached when the benefits and claims of the technology are weighed in the presence of knowledge gained by observation or training and the ability to work with peers in a group. An area for further research is to carry out a similar study in an area where development agency do not give free input support but only technical information of CF.

9.2 Recommendations

The creation of optimal conditions for the adoption of technologies is considered as the job of people and institutions engaged in promoting agricultural development. Innovations can be good if all the other conditions are in perfect order.

Non adopting farmers were able to mention the increase in maize yields as the major benefit of CF whilst other benefits on water, soil and land management were not convincingly given. This leads to a recommendation that GOAL Zimbabwe in collaboration with AGRITEX need to set out paired demonstration plots of CF and conventional farming in order to convince farmers of the technology. GOAL Zimbabwe needs to phase out the free inputs provision gradually so that those who practise CF do not become entirely dependent on the free inputs for their maize production but to adapt the technology to cash crop production and other income generating activities. This empowers communities to identify a diversity of livelihoods which can fit in their area and address their needs. The diversification of livelihood activities have the advantages of providing alternatives for the labour constrained households as well as improving the nutrition of households for example from vegetables and meat products.

GOAL Zimbabwe needs to actively involve the private sector in the implementation of the CF project in two ways. The first is to engage them to deal with the smallholder farmers directly as suppliers of agricultural inputs and secondly by linking the private sector to farmers as traders for the marketing function of the maize value chain. Examples of input suppliers which can be engaged are SEED CO, Pannar seeds, Zimbabwe Fertilizer Company (ZFC) and Windmill. On the marketing side of surplus maize processors such as National Foods, Agri-foods and Blue Ribbon can be engaged. The resuscitation of the maize value chain which had collapsed due to the economic impasse can be facilitated by GOAL Zimbabwe.

GOAL Zimbabwe need to involve all stakeholders at project identification and monitoring phase in order to create ownership of the project through participation of various stakeholders in the project. The respondents in the study area were not conversant of the environmental benefits brought about by CF. The environmental management authority has a role to play in reinforcing the importance of paying attention to environmental issues in CF as there was no clear evidence of farmers knowledge

on these. The integration of CF with other projects on nutrition, HIV/AIDS, trees and livestock is recommended for a holistic approach to farming as a system. CF in an integrated farming system with livestock and trees has the potential of promoting sustainable livelihoods and achieve food security.

Knowledge is the foundation of success for CF uptake and it was noted that the training and monitoring done by the Lead farmer, AGRITEX worker and GOAL Zimbabwe field worker attributed to the CF practices being carried out according to the guidelines and these need to be maintained. Introduction of CF in institutions such as schools can add on to the continued practise of CF in the long term as the children can learn from a young age and they can adapt the practice according to their context. Mechanised CF which uses ox-drawn implements such as direct seeders and Magoye tine rippers as well as manually operated machines for example the jab planter needs to be promoted simultaneously with the CF using hoes so that all the farmers in the social strata are included and choices are made according to household available resources.

The dual function of GOAL Zimbabwe as a relief and developmental organisation in the same area is incompatible because it confuses the farmers. GOAL Zimbabwe had provided food aid and input support as relief aid as well as implement CF. As evidenced by one of the non-adopting farmers that she was looking forward to benefit from food aid in the case of crop failure on her conventional field. This could have contributed to her non- adopting of CF as the dependency syndrome was displayed. Thus GOAL Zimbabwe has to take one function of either relief or development in order to achieve specific objectives and ensure sustainability of development projects.

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Annexes

Annex 1: Household interview questions

Village Name				Household category& No.		Date
HHH Age& Sex	Under 5yrs	5-18yrs	18-60yrs	>60		Total
Size of arable land Crops grown						Season used CF? Maize area under CF
Agricultural activities to get income/food on farm			Non-agricultural activities			

*most important

1. What was the yield of maize grown under CF in the past season?

2. What maize area was under conventional farming? What was the yield?

3. How much maize was sold?

4. What was considered during selection for you to take up/not to take part in CF?

5. How do you make conservation planting basins? [(Dimensions) Right angled grid, 0.9x0.6mgrid, 0.15x0.15x0.15m planting station]

6. What are the inputs required for CF?

7. Who is carrying out the CF activities in this household? [Own, hired]

8. What activities do you carry out from one harvest to the next harvest? [Processes-farming calendar (time allocation for CF)]
9. How are problems arising during the cropping calendar addressed? /If you decide to do CF how would you start?
10. Compare the growth of maize on CF and that on conventional field?
11. How do you feel when using/not using CF?
12. What are the benefits of CF?
13. What are the claims of CF?
14. Give the reasons why you are using/not using CF?

Annex 2: Focus group discussions interview questions

FGD Category:

Village name:

Date

Time

Interview Setting

Women

Men

Total

Topics: Farming method used, labour, farm tools, yield, income, soil fertility, water retention, workload, time, labour, social status, knowledge, skills

1. What are the livelihood activities of households in Ward 12? Which is the most important? Why?
2. Are there households in the last season that produced enough maize to take them through to the next harvest? What are the characteristics of these households? How do they produce their maize crop?
3. Are there households in the last season that did not produce enough maize to take them through to the next harvest? What are the characteristics of these households? How do they produce their maize crop?
4. What has been the effect of *CF* on labour for women, men, household activities and community activities? [Matrix]
5. Comment on the effect of *CF* on time to do (productive, reproductive and community roles for women) various activities for women, men, household and community?
6. What has been the effect of *CF* on natural, physical, economical and human resources?
7. How has *CF* affected the culture of men, women, households and community?
8. What are the advantages of *CF*? [Benefits, knowledge, ability, status]
9. What are the challenges of *CF*? [Claims, knowledge, ability, status]
10. What *CF* training is available to farmers? Who provides the training?

Gender Analysis Matrix: Use of *CF* in Maize production

	Labour	Resources	Time	Culture
Women				
Men				
Households				
Community				

FGD Interaction remarks

Annex 3: Key informants interview questions

Interview setting

Date

Time

A). 1Lead farmer, B).1AGRITEX Worker and C).1GOAL Zimbabwe Field officer

1. What are the main livelihood activities of households in ward 12? Which of these is most important? Why?
2. What are the main income generating activities for households in ward 12? Which of these is most important? Why?
3. What has been the trend for the past 3 seasons in maize productivity (yield /unit area) in ward 12?
[To refer to yield records]
4. How significant has been the maize yield gap for participating, adopting and non-adopting farmers?
5. What benefits have been noted by farmers from the use of CF?
6. In your view what are the constraints of CF?
7. What has been the effect of using CF on labour for women, men, household and community activities?
8. Comment on the effect of CF on time (productive, reproductive and community roles) for women, men, household and community activities?
9. What has been the effect of CF on natural, physical, economical and human resources?
10. How has CF affected the culture of men, women, households and community?
11. What challenges do farmers share with you about CF?
12. How can the challenges be addressed?
13. What CF knowledge, skills and resources are available to farmers?
14. What is the social status of farmers in each of the three categories?
15. What lessons can be learnt from CF in maize production?

