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# Conservation Agriculture practices and challenges in Zimbabwe

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## Introduction

An increasing number of non-governmental organizations (NGOs) through funding from multiple donors are promoting conservation agriculture (CA) in the smallholder areas of Zimbabwe. CA has been seen as technology option that can increase yields of a wide range of crops by resource-poor farmers even in drier agro-ecological regions. Farmers across Zimbabwe have shown a growing interest in the CA technology with evidence of yield gains of between 10 and more than 100% depending on input levels and the experience of the farm household (Mazvimavi et al., 2008). Cases of spontaneous adoption are being observed in areas where demonstrations and training programs have been well supported by NGOs, research and extension institutes. However there have been arguments that CA adoption in sub Saharan Africa (SSA) is low due to the socio economic conditions in which CA is implemented (Giller et al.,2009) and that CA can only improve food security in SSA if farmers have access to herbicides and fertilizers (Gowing and Palmer, 2008).

This study was aimed at assessing the adoption trends of CA principles and practices in smallholder areas of Zimbabwe. The study also assessed the socioeconomic impacts of CA technologies to vulnerable farm households.

## Methodology

The study is based on a panel survey approach that started in 2006/07 cropping season and repeated in 2007/08 and 2008/09. The study was implemented in 15 districts of Zimbabwe where different NGOs under the Department for International Development's (DFID's) Protracted Relief Programme (PRP), European Union (EU), and European Commission Humanitarian Aid Office (ECHO) funding have been promoting CA over the past five years. The panel study targeted 30 households per district with CA experience of at least 2 years. The majority of the sampled farmers were vulnerable households typically targeted by NGO relief programs. The questionnaire interviews collected information on CA practices, adoption, and associated gains and constraints.

## Results and Discussion

Over the years, there has been generally a reduction in the proportion of farmers practicing CA components (Table 1). Marked decreases were with application of inorganic fertilizers which decreased from 71% for basal fertilizer and 94% of farmers for top dressing fertilizers in the 2004/05 cropping to 38% and 70% respectively in 2004/05. Basin digging has also dropped with 89% of farmers practicing it in 2008/09 from 100% in 2004/05. The digging of planting basins is done using hand hoes and may require more labor in clay soils. As an option to improve labor demand associated with digging basins, there is need for adopting mechanized CA technologies. For resource endowed farmers, the use of rippers and direct seeding equipment could be good options particularly if the linkages to both input and output markets are secured for improved profitability.

**Table 1.** Proportion (%) of farmers using the particular components of CA techniques

| Technique | Cropping season | | | | |
|---|---|---|---|---|---|
| | 2004/05[a] | 2005/06[a] | 2006/07 | 2007/08 | 2008/09 |
| Winter weeding | 51 | 87 | 76 | 71 | 63 |
| Application of mulch | 40 | 75 | 69 | 70 | 56 |
| Digging of basins | 100 | 99 | 99 | 97 | 89 |
| Application of manure | 89 | 88 | 89 | 87 | 80 |
| Application of basal fertilizer | 71 | 75 | 74 | 66 | 38 |
| Application of top dressing | 94 | 92 | 92 | 88 | 70 |
| Post-planting timely weeding | 94 | 98 | 99 | 96 | 85 |
| Crop rotation | 8 | 13 | 13 | 18 | 19 |

[a] Data for 2004/2005 and 2005/2006 seasons was obtained during the 2006/2007 survey

Farmers practising CA are expected to keep their plots weed free throughout the season. Weeding should commence as soon as weeds appear. This activity however increases labor requirements for CA plots as they require an average of 2−3 times weeding per season compared to once for conventional draft tillage plots. Because of other off-season household commitments farmers find it difficult to practice winter weeding. The trend over the years shows a decline in the proportion of farmers doing winter weeding and this could mean farmers are adopting only CA components that fit into their current farming practices. Forty-four percent of the interviewed farmers did not mulch their plots during the 2008/09 cropping season, although this number dropped from 60% in 2004/05 cropping season. These farmers indicated they had fed crop residues to livestock. Competing uses for crop residues for dry season feeding and roofing in some parts of Zimbabwe are the most important factors that affected adoption of this practice. Another constraint to the practice of mulching is low production of biomass in smallholder farms which limits farmers' ability to meet the minimum recommended mulch cover of 30% in CA (Giller et al., 2009). However, various other materials can also be used as mulch including leaf litter and grass. There were also some farmers who tried mulching, but discontinued since they could not really notice any immediate benefits and some had no knowledge about the benefits of mulching. Crop rotation (cereal –legume) is the CA principle, but it is only practiced by 19% farmers in 2008/09 cropping season. Although this number increased over the years from 8% in 2004/05 cropping season, crop rotation has hardly been adopted by farmers across the 15 districts of Zimbabwe. The reasons for not practicing rotation varied with many farmers (45.1%) preferring to continue growing the staple food on their CA plot, an indication of food insecurity. Fifteen percent stated the unavailability of legume seed as the reason for not practicing rotation with legumes.

CA promotion has commonly been associated with free input packages where farmers were given seed and fertilizer for their plots. These input handouts were usually just enough for small CA plots. There was evidence to show that access to inputs influenced the area allocated to CA. Farmers tended to expand the area under CA on the basis of support from NGOs in the form of inputs (Figure 1). Increasing CA plot size results in an increase in labor requirements for weeding and digging planting basins since these activities are labor intensive (Baudeon et al., 2007). Labor saving technologies such as introducing other CA implements other than the hand hoe and encouraging use of herbicides should be promoted to ensure CA is implemented at a large scale.

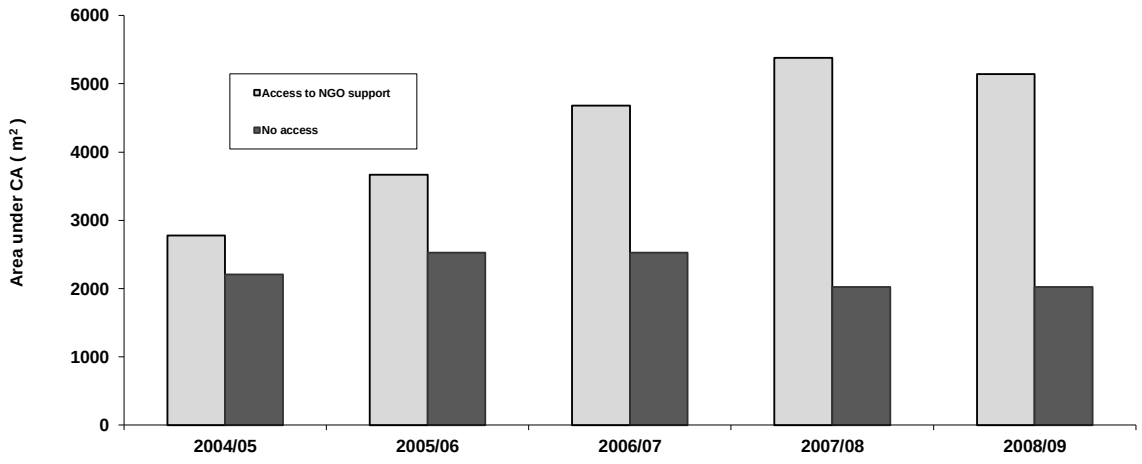


**Figure 12.** Influence of NGO support on CA plot area

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