Promotion of Growth and Improved Food Security through the Scaling Up Of Conservation Agriculture (CA) As a Sustainable Land Management (SLM) Tool: CA-SARD Project M&E Impact Study

Draft

September 2010

by

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ACKNOWLEDGEMENTS

I am grateful for the opportunity to interact with stakeholders in engaged in conservation farming and would like to pay special tribute to the following persons for making the evaluation process a success:

- CA FFS Facilitators at the district and all the enumerators, KARI staff.
- Chairpersons and other officials of all FFS.
- Mr Mwangi for assisting in Locating FFS.
- Two Germany visiting students for their involvement in the evaluation process.
- Dr Okoba B., for all the assistance provided
- African Conservation Tillage Initiative (ACT) personnel led by Eng Saidi Mkomwa and Mr Tom Alpina
- Ministry of agriculture personnel for allowing me to use their facilities as venues for meetings.

ACRONYMS

CF/CA	Conservation Farming/Conservation Agriculture
ACT	African Conservation Tillage Network
FAO	Food and Agriculture Organization of the United Nations
CA-SARDII	Conservation Agriculture Project- Sustainable Agriculture and Rural Development
M&E	Monitoring and Evaluation
SLM	sustainable land management
MoA	Ministry of Agriculture
CA - FFS	Conservation Agriculture Farmer Field Schools
HH	Household
CBO	Community Based Organization
AEZ	Agro Ecological Zone

EXECUTIVE SUMMARY

Background

This document is a report on the M&E impact study to map out the extent of adoption of CA in the country and specifically in the project districts. The CA-SARD project implemented by African Conservation Tillage Network (ACT) in partnership with Food and Agriculture Organization of the United Nations (FAO), and Kenya Agricultural Research Institute KARI have been involved in the implementation of Conservation Agriculture Project (CA-SARDII) in 5 districts since 2004 namely Siaya, Bungoma, Nakuru, Mbeere and Laikipia districts in Kenya. The objective of the project was to contribute to the promotion of growth and improved food security in Kenya through the scaling up of conservation agriculture (CA) as a sustainable land management (SLM) tool. The project approach has been holistic in articulating cross cutting issues complimenting adoption of CA technology by smallholder farmers. These include involvement of private sector especially the input supply chain, CA implement supply chain, agro-processing and market access. Since its inception, the project has played a critical role in providing a benchmark and lessons for establishment of new projects by new players in the agricultural sector.

The project was executed through the farmer field school FFS approach with each district having an average of 10 FFS comprising of 25-30 farmers. The extension wing of the ministry of agriculture MoA are the direct implementers of the project on the ground in collaboration with local partners. CA-SARD project has been implemented in two phases. Phase 1 ended in 2006 and 2nd phase started in 2007 and is ending in 2010.

The objective of the evaluation was to carry out M&E impact study to map out the extent of adoption of CA in the country and specifically in the project districts. This was carried out in recognition of the multi-diversity nature that the project has been based since inception.

Project design and relevance of results achieved

The project design was creative as it brought on board other stakeholders like……., already providing substantial inputs on credit to the smallholder farmers, and a research institution with competencies in natural resource management and CA, training and credit mechanism for inputs and implements. The design however was often rigid and was focused on mass formation of new CA FFS without making sure that the existing CA FFS were fully functional.

Although the project achieved its key result targets i.e. 1,482 farmers reached with Trained facilitator were provided with a reference manual developed by ACT "self-learning curriculum on conservation Agriculture" which they continue to refer to while with the FFS group members.

Efficiency and effectiveness
The key result targets were achieved efficiently within the resources allocated despite the often shoe string budgets and delays in disbursement of funds. This was considered inappropriate and did not facilitate interventions to fit in with the conservation farming cycle in particular and smallholder agriculture in general. Farmers would often receive seeds late in the planting season.

The evaluator through a survey noted that although the farmer's knowledge of CF practices and its benefits had increased the area under conservation practices remained largely limited to promotional plots even among some of the farmer leaders in the CF/CA programme. One of the major factors sited by CA farmers include the high initial cost of starting CA especially the cost of Herbicides and the lag between the initial point in starting CA and achieving full potential benefits of CA. Yields under CA gradually rise as the soil heals by accumulating fertility and conserving moisture through permanent soil cover. Drought especially in Mbbere, Laikipia and Nakuru Districts routinely back-tracked these benefits once permanent cover crop is lost to livestock as feed or withered out due to severe drought. The other major factor is that access to CA equipment is still a big problem for farmers. Farmers claim that the equipment is often too expensive for them to buy and that credit facilities to enable them to purchase the equipment is limited. There is clearly need to invest resources in better understanding the factors that drive adoption of CF technologies. This is particularly important for programmes aimed at up-scaling CF practices in the country in order to increase their effectiveness beyond numbers of farmers trained and engaged in demo plots.

Impact and sustainability
Although the results achieved had mixed impact on household food security and incomes in of the project, the acquired CF knowledge and assets in the form of CA equipment has potential to make a significant contribution to household food security & income from the third phase onwards for the participating farmers. There were some shortfalls in the feedback mechanisms in monitoring of changes in the project farmers for example the although monitoring partly participatory, there was disconnected from implementation reducing opportunities for collective learning and integration of lessons in the project probably due to inflexibilities innate in the project design and rigid procurement government and FAO procedures.

One distinct feature of CF is that it reduced demand for labour especially for land preparation and weeding on women and children who traditionally bear the burden of labour in the smallholder sector. Women felt there was now time to rest for farmers practicing CF, This enabled children to have more time to study and play. The women practicing CA could now engage in small business, value add and market their produce.

The project raised a number of key policy and institutional issues which have a bearing on wide scale impact and sustainability of up-scaling and out-scaling CA. For example there is a disconnect between the short-term and long-term approaches to development. In the short-term, there is tendency to minimize the dependency syndrome at the expense of having sufficient incubation period and resources for sustained long term adoption of CA. This is manifested in the drive to establish new CA FFS while the old ones struggle or disintegrate in some areas. There are also no strong linkages to the market because intermitted adoption means that there is no critical mass for group marketing of produce to achieve economies of scale. There is therefore need for harmonized and long term approaches to development of agricultural input and output markets for the smallholder sector beyond limited project approaches which are not only contradictory but also short term and disconnected from the development of supportive agro-dealer networks. Another issue raised is the lack of institutionalization of CF in key service providers to the smallholder sector especially the credit service for input and equipment purchase as well as marketing initiatives. There is also need to identify commercial oriented cash crops for sustained CA and increased training on CA as a business. Linkages to programmes like Kilimo Biashara should be strengthened.

Conclusions

From the quantitative impact surveys and consultations with farmers and other stakeholders e.g. government extension services, the evaluator concluded that:

- There are significant yield increases in maize in the two year project period attributable to CA practices. However farmers appreciated the contribution of legume rotation in terms of access to a food crop during the critical food shortage period and for increased soil fertility.
- There was some significant increase in area brought under CA practices beyond the promotional Farmer Field Schools plots through adoption by a section of FFS farmers. Further more there was some evidence of spontaneous adoption of CA package in the participating communities.
- CA requires a long incubation period for tangible results to be achieved. The initial direct and opportunity cost for CA is high, but subsequent costs are lower. For example, a smallholder farmer requires more herbicide at the beginning, once obnoxious weeds are wiped out, less herbicide is needed. Crop residue which would otherwise be used as animal fodder is used as soil cover, at the beginning, this may seem like a huge opportunituy cost to the smallholder farmer, but as the crp yields increase, the opportunity cost is lower. This period is lengthened by occurrence of drought which wipes out the benefits of CA.
- The CA package entails reduced labour for land preparation and weeding which is a benefit to women and children. Traditionally, land

preparation and weeding is largely borne by women and children in the smallholder sector. The freed labour for children gave them more time to study and play, while women had enough time to engage in other small business, value adding and marketing of their produce.

- CA farming is limited to food crops as opposed to cash crops. There is need to identify appropriate cash crops for inclusion in CA farming for increased profitability and sustainability.
- Most farmers did not own CA equipment and often, they had to wait for a long period to be able to hire one. The farmers alluded the low availability of equipment to the high cost of equipment and lack of credit to purchase them.
- Most farmers complained that hiring CA equipment was rather high. Some of the equipment hires also charge exorbitant prices for spraying herbicides thus discouraging many potential CA adopters.
- Increased knowledge of CA is not a necessary but not a sufficient condition for farmers to adopt the technology and increase productivity and incomes. To support increase in knowledge about CA, a range of sustained investments over the initial adoption in CA and changes in policies and institutional arrangements are necessary to support wide spread adoption of CF technologies. Sustained contact and training in CA for attitude change will trigger changes in ways of farming in smallholder communities.

Recommendations

The evaluator offers recommendations that are designed to improve understanding of conservation agriculture/farming and its widespread uptake in the smallholder sector.

Recommendation 1
Increased Commercialization of CA Farming to increase Sustainability and Attractiveness of CA
Currently most CA activities are based mainly on subsistence/food crop. In order to increase commercialization, there is need to identify suitable cash crops for increased commercialization of CA production.

Recommendation 2
Facilitation for collective action and change is the key ingredient There is need to encourage collective action in areas such as value addition and marketing of agricultural produce for sustainability.

Recommendation 3
There is scope for donors to support the development of dedicated monitoring and learning capacities in order to build an understanding of the key drivers of CA adoption and how land tenure and traditional authority and practices facilitate or constraint the adoption of practices designed to improve productivity and livelihoods in the smallholder sector. This would

further strengthen collaborative ways of working between different platform stakeholders.

Recommendation 3
There is need to commission a study to understand the opportunity costs and trade-offs a smallholder farmer experiences while adopting CA.

Recommendation 4
There is need to wave taxes on CA equipment and raw materials to reduce the cost of the equipment. Most of the farmers complained that the cost of equipment was rather high for them to purchaser.

Recommendation 5
There is a need to commission a study to evaluate the current charges for hiring equipment and purchase of chemicals.

Recommendation 6
Most of the farmers indicated that they have no access to credit to purchase CA equipment. There is therefore need to explore ways in which local banks can avail credit to at reasonable rates to enable them to purchase the equipment. This can be initiated through the Ministry of Agriculture.

1. Introduction

1.1 Background

The CA-SARD Project in Kenya is hosted by the Ministry of Agriculture. Project offices are located at the Kenya Agricultural Research Institute (KARI) in Nairobi. The five project pilot districts selected were Bungoma, Laikipia, Mbeere, Nakuru and Siaya; each district team of facilitators was headed by a district coordinator, often assigned to the project (at about 50% of their time) from the District Ministry of Agriculture offices.

Broadly conservation agriculture (CA) relates to a package of practices based on three key principles i.e. reduced soil disturbance, provision of soil cover and the use of crop rotations. These practices seek to reduce land degradation, improve soil organic matter and conserve soil moisture in line with the concepts of sustainable agriculture

1.2 The Project

The purpose of CA-SARD project is to contribute to the promotion of growth and improved food security in Kenya through the scaling up of conservation agriculture (CA) as a sustainable land management (SLM) tool. The development objective of the project was to improve food security and rural livelihoods and build a foundation for the expansion of conservation agriculture to contribute to sustainable agriculture and rural development. The immediate objective was to ensure the adoption of profitable conservation agriculture practices by small farmers in at least three districts in two countries. The project was implemented in Kenya through a range of activities, designed to achieve the following core outputs:

- CA practices applied by farmers;
- owners of draught animal power and tractors enabled to offer hire services in CA practices to others;
- extension staff trained to organize, facilitate and provide ongoing support to CA farmer field schools (FFS);
- capacity within the local manufacturing and retail sector for the supply of equipment and tools suitable for CA inputs improved;
- knowledge networks for exchanging experiences established at local, national and regional levels; and

CA-SARD project has been implemented in the 5 districts since 2004 with phase 1 ending in 2006 and 2nd phase starting from 2007 to 2010. In both phases, emphasis has been put in using the farmer field school approach to introduce the technology to the farmers then focus on individual farmer adoption afterwards. The groups targeted in phase 2 are different from those involved in phase one hence there exist a

critical mass in every district of farmers exposed to CA technology. The project approach has been holistic in articulating cross cutting issues complimenting adoption of CA technology by smallholder farmers. These include involvement of private sector especially the input supply chain, CA implement supply chain, agro-processing and market access. Since its inception, the project has played a critical role in providing a benchmark and lessons for establishment of new projects by new players in the agricultural sector. It is based on the above multi-diversity nature of the project that the project coordination team have agreed to carry out M&E impact study to map out the extent of adoption of CA in the country and specifically in the project districts.

2. Evaluation Methodology

2.1 Purpose of the Project Evaluation

The objective of the evaluation was to assess whether the purpose and the results of the project were achieved with respect to implementation, outcomes and impact (see TOR's—appendix 1).

Key results expected from the evaluation were outlined in the TOR's and briefing meetings:

a) A critical review of project implementation to date, including project management issues and the rate of success at completion;
b) Constraints and bottlenecks related to project implementation;
c) Assessment of the impact of the programme and lessons learned that can be applied to expand this programme or design similar ones
d) Enhanced M&E capacities for CA-SARD through the evaluation process;
e) A quality and credible evaluation report that can be shared with stakeholders and contribute to promotion of good practices in conservation farming and their widespread uptake in the smallholder sector.

An evaluation framework incorporating key issues for investigation as provided for by the TOR's was developed to guide discussions with a wide range of programme stakeholders and communities.

The critical question on the minds of the evaluation team was "***what are the results, lessons and how are these being taken forward beyond the project stage and what are the opportunities for the donors to support the scaling-up of positive elements of CA?"***

2.2 Study Areas

The impact assessment will be carried out in selected communities living in the areas where Conservation Agriculture Project (CA-SARD) project has been implementating conservation Agriculture (CA). These areas include Siaya, Bungoma, Nakuru, Mbeere and Laikipia districts in Kenya. The study will cover a sample from about 50 FFS (average of 10 in each of the 5 districts) comprising of 25-30 farmers each from which the project has been implementing the scaling up of conservation agriculture (CA) as a sustainable land management (SLM).

2.3 Sampling

The overall sampling frame for the assessment will be the 1375 farmers (households) participating in the project through FFS. One hundred and sixty five farmers from twenty out of the fifty project farmer field schools (40%) will participate in the farmer/household interview component representing just over twelve percent of the overall sampling frame. A sample of about 75 farmers in none-participating FFS will also be interviewed. Participation in the household interviews will be voluntary although limited to farmers/households that had participated in the project activities. Target population selected through randomized sampling method.

Table 1: Sampling for farmers/household interview (HHI) component

District	Total Farmers	Sample farmers participating CA farmers	Sample farmers None participating CA farmers	Sample farmers None participating None CA farmers
Mbeere	159	59	18	18
Laikipia	83	31	9	9
Nakuru	184	68	20	20
Siaya	147	55	16	16
Bugoma	236	88	26	26
	809	300	90	90

A total of fifteen Focus Group Discussions will be held in the communities where the twenty selected FFS are located. Participation in these discussions will be voluntary and will include both project and non-project community members.

Table 2: Sampling for the Focus Group (FGD) component

Name of Village	Total # FGD	Total # HHs	Focus Group in Non Participating FFS	Number of Interviewees
Siaya	3	36	1	12-15
Bungoma	3	36	1	12-15
Nakuru	3	36	1	12-15
Mbeere	3	36	1	12-15
Laikipia	**3**	36	1	12-15
Total	**15**	**180**	**5**	**60-75**

2.4 Data Collection Methods

2.4.1 Social Impact Assessment tools and methods

Stakeholder Analysis was our entry point to CA-SARD social impact assessment. This addressed strategic questions, such as who are the key stakeholders? what are their interests in the project? What are the power differentials between them? what relative influence do they have on the operation? Specifically the following aspects of the project will be addressed:

- How many CA - FFS groups established in both phase 1 and 2 and by interacting with group members, district coordinating team and National Project Coordinator establish the adoption extent in every district.
- Identify the most preferred CA option adopted by farmers under various AEZ and reasons for success and challenges.

This information was collected using **Secondary Data Review** and consultation with project staff identify and to establish a relevant framework and key social variables based on the objectives, redefined as indicators necessary for the impact assessment advance. Important documents that were sought to identify the baseline:

2.4.2 Map out the CA implement supply chain

Key informants in each category of CA supply chain was consulted (i.e.; extension agents, the key players involved, utilization of the implement by the groups and individual farmers, hire service provision by local entrepreneurs etc) and gain consensus on what competencies are necessary to achieve. With the stakeholders, the current-state extended CA supply chain stream map will be drawn: This will help to understand what is going on currently within and between the organizations and stakeholders so that appropriate actions can be taken to improve those processes. Drawing a map of current process forces participants in the chain to understand their operations and see why things are the way they are. The group discussion recommendations will be used to draw the future-state extended CA supply map and implementation plan. This in turn will assist in Identification of areas which can improve processes and Prioritization of improvement areas based potential benefits and by ease of implementation.

2.4.3 Household Interviews, Group Discussions and Key Informant Interviews

At each assessment site visited the consultant and project team held a meeting with community members to explain the objectives of the exercise and the participatory tools that will be used. Enumerators and FFS leaders or elders to be used to guide the enumerators were identified. There followed a training session to familiarize the enumerators with the questionnaire and the randomly pre-selected households. Once this was done, the enumerators were released to carry out the household interviews with these identified persons under close supervision of a supervisor. The remaining community members and FFS members were then invited to participate in the focus group discussion. The Focus Group Discussions were facilitated by the consultant and supervisors.

During the Focus Group Discussions a semi structured questionnaire was used to collect community level perceptions on project impact. The discussions were used to identify the strengths and weaknesses of the project, as well as potential opportunities and threats.

2.5 Data Analysis

All data were analyzed by using SPSS/PC+ (the Statistical Package for the Social Sciences, Personal Computer Version) and STATA. Appropriate statistical procedures for description and inference will be used. The alpha level will be set priori at .05. The quantitative data from the before and after scoring and impact scoring exercises will be tested for normal distribution using the P-P plot function in

SPSS. A comparison of mean scores from the before and after exercises will be calculated at 95% confidence interval using SPSS. The relative mean score of project benefits derived from the impact scoring exercises will be calculated using Excel.

Assessment of the scaling up of conservation agriculture (CA) as a sustainable land management (SLM) tool activities by CA-SARD project will be two pronged:

a. Measure impacts as a result of the trainings and and outreach activities of CA-SARD project, based on the established project indicators
b. Generate lessons that could be used to improve interventions during the remaining project period and subsequent phases. This information will also be useful for implementation similar projects

2.6 Evaluation limitations

Despite the different approaches used to get an accurate view of the programme and the results achieved, there were still some constraints in the evaluation process:

- Gaps on CF impact monitoring data and the two agricultural season duration of the project made it difficult to conclusively determine changes as a result of the project intervention. For example the key factors driving CF adoption or lack of it cannot be determined in two seasons which were highly variable.
- It was difficult to secure interviews with some key informants due to time shortage.

3. Evaluation Findings

The evaluation findings are presented by key result areas in this main report and are complemented by detailed quantitative and qualitative reports produced by ACT, CASARD and the Consultant.

3.1 Key result 1

Results for Objective 1: Adoption of profitable conservation agriculture practices by smallholder farmers in Kenya expanded

3.1.1 Key Result 1.1 Achievements

CA FFS participating farmers experimenting with CA using the FFS approaches and applying adapted CA practices in own plots. This key result area had two performance indicators.

- Area under CA has further increased by at least 500 ha by end of the project, i.e. year 3
- At least 100 new FFS groups established and functional
- About 2000 farmers practicing CA at end of year 3
- Over 80% of the participating households applying defined CA options in own private plots

The project adopted an intensive farmer - to - farmer learning process based around the FFS extension methodology which proved to be an effective tool in technology transfer. The approach was backed by a conscious intensity in encouraging and exhausting farmer to farmer learning and creativity. This was achieved through extended and elaborate farmer to farmer exchange visits, field-day competitions, dramatization and role plays of own experiences among other interactive and empowerment processes.

The project approach enabled the project to readily achieve these targets with a total of 3166 smallholder farmers receiving training and FSP's over the two agricultural seasons—2005/06 and 2006/7.

Table 3: Summary of Number of persons practicing, aware and area under CA in Project areas

District	*No. of farmers Practicing*	*No. of farmers Aware*	*Area under CA (acres)*
Nakuru	***882***	***5630***	***1717***
Bungoma	***156***	***590***	***119***
Siaya	***699***	***7750***	***266***
Mbeere	***309***	***905***	***137***
Laikipia	***1120***	***7100***	***20785***
Totals	**3166**	**21975**	**23024**

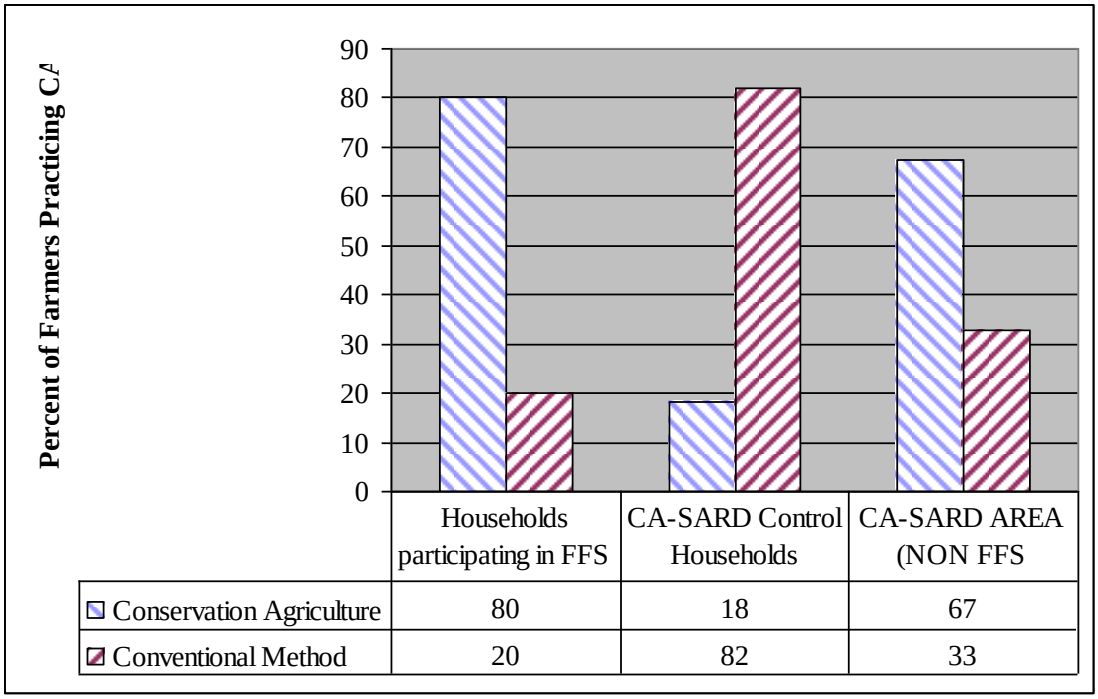


Figure 1: Method of Crop Production in CA-SARD Project Areas (Nakuru, Laikipia, Mbeere survey data)

District	Households participating in FFS	Conservation Agriculture	Conventional Method
Laikipia	Households participating in FFS	74	26
	CA-SARD Control Households	0	100
	CA-SARD AREA (NON FFS Households	80	20
Mbeere	Households participating in FFS	76	24
	CA-SARD Control Households	0	100
	CA-SARD AREA (NON FFS Households	67	33
Nakuru	Households participating in FFS	91	9
	CA-SARD Control Households	18	82
	CA-SARD AREA (NON FFS Households	64	36

Collaborating institutions, private farmer training institutions (NGO or church-led, private sector operators, marketing establishments etc.) in the host district. On the second day they would visit fellow FFS farmers, culminating at the host farmers plots on (the third and climax day) the field-day.

The project also produced CF manual through ACT in support of conservation farming. Broadly there was a positive response to the CA training as evidenced by the farmer's knowledge of CA benefits during Focus Group interviews and Key informant interviews. The adopted CA practices include crop diversification with the introduction of legume rotations in the maize growing was seen as a positive practice

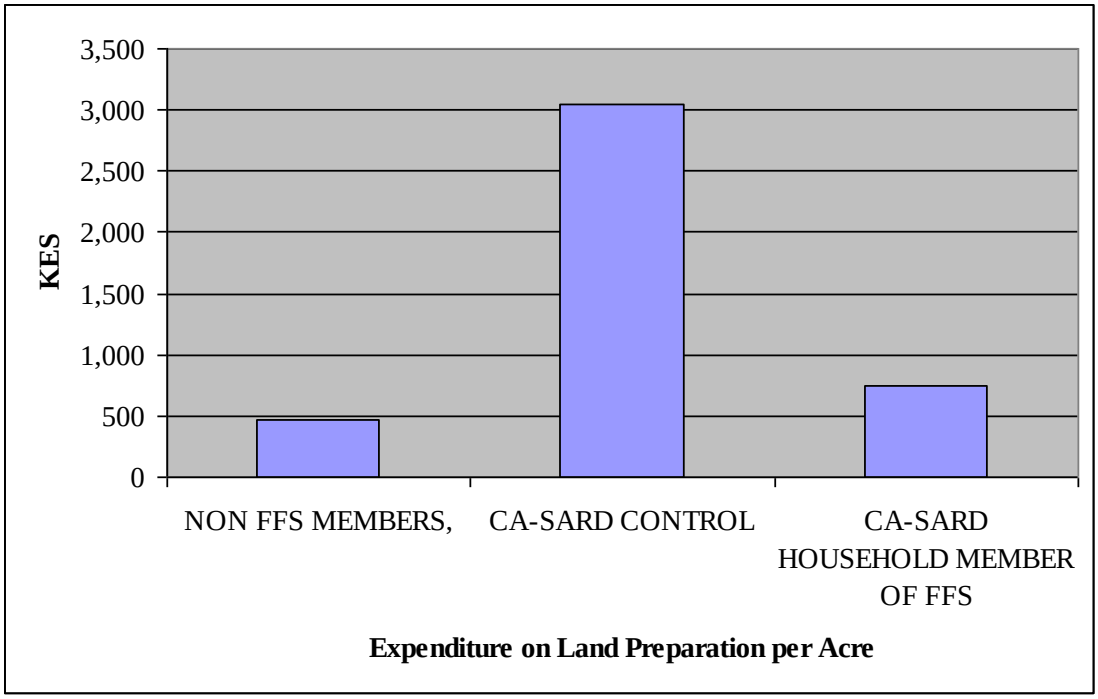
that has increased food production and availability at critical periods in the farming cycle due to the early maturing of such crops as cowpeas. Farmers will continue these CA practices although new challenges such as markets for the legume crops (cowpeas & velvet beans) have starting to emerge as farmers produce surplus to own consumption and local markets. However, the increased demands for seed is welcome relieve to the CA farmers.

3.1.2 Key Result 1.2 Achievements

Farmers more knowledgeable on CA and learning and applying CA practices into viable farming enterprises. The Objectively Verifiable Indicators for this Key Result area were:

1. 70% of Farmers can explain and interpret farming related land degradation cause-effect issues
2. Target farmers groups/communities streamline SLM/CA among their priority development issues and demanding/highlighting appropriate government/donor support in related programmes.
3. Number of CA-FFS requests to district development plans for assistance and support in SLM/CA issues is doubling up to year 2 and tripling at year 3.

During Focus Group Interviews, Farmers interviewed indicated that they are aware of the CF benefits especially early planting with the first rains and even where they are not adopting the full CF package they strive to plant early through conventional ploughing. For example those with access to animal draught power would plough and plant at the same time to reduce operations and plant with the moisture from the first rains. Although germination rate may be affected they see a double benefit i.e. planting with the first rains and controlling weeds through the ploughing which they would not be able to do with ripping when faced with limited time.



3.1.3 Key Result 1.3 Achievements

CA FFS graduate farmers organised in CA-SLM innovation networks stimulating collective SLM/CA responsibilities, enhanced social learning and widespread CA adoption (scaling out). The Objectively Verifiable Indicators for this Key Result area were:

1. 90% of the graduated FFS groups are organised by themselves into self-sustaining farmer innovation/learning national network.
2. This means > 100 FFS groups in year 2 and > 200 FFS groups at year 3.

In Kenya an Umbrella FFS group is fully functional in Bungoma and Siaya district while other districts such as Mbeere and Nakuru are at an advanced stage of establishing the networks.

3.1.4 Challenges

While there was stakeholder support and belief in the potential of CA to improve smallholder livelihoods, the evaluation team observed a number of issues and challenges that impacted on the effective use of the CA training in the pilot project and smallholder sector as a whole.

- Lack of access to fertilizer. In this some farmers in Nakuru have found how to use the direct-seeders with manure as a substitute to fertilizer. They claimed this works brilliantly as long as the manure is fine and dry.
- Transporting the equipment form one farm to another, sometimes two to three kilometres apart and calling for disassembly of the units to facilitate transport.

- Crude operation management schemes where the Chair and Treasurer of the groups who are not experts on the use of equipment insist on following the equipment hirer around as a safe-guard to possible equipment breakage.
- Various socio-cultural biases and myths such as, introducing equipment for CA where work becomes so light that the farmers feel guilty if not sinful. In Mbeere some farmers reported that it is biblical truth that farming must sweat hard, a principle that CA may be seen to be opposing.

3.1.5 Lessons

The low CA technology adoption rates beyond project demonstration packages and FFS point to the need for a different approach to understand the key drivers of CF adoption as training and increased knowledge of CF benefits is not a sufficient condition for widespread uptake of CF in smallholder communities. There is no conclusive evidence that show under what conditions CF thrives in the smallholder sector. CA requires a long incubation period.

One of the major factors sited by CA farmers include the high initial cost of starting CA especially the cost of Herbicides and the lag between the initial point in starting CA and achieving full potential benefits of CA. Yields under CA gradually rise as the soil heals by accumulating fertility and conserving moisture through permanent soil cover. Drought especially in Mbbere, Laikipia and Nakuru Districts routinely back-tracked these benefits once permanent cover crop is lost to livestock as feed or withered out due to severe drought. The other major factor is that access to CA equipment is still a big problem for farmers. Farmers claim that the equipment is often too expensive for them to buy and that credit facilities to enable them to purchase the equipment is limited. There is clearly need to invest resources in better understanding the factors that drive adoption of CF technologies. This is particularly important for programmes aimed at up-scaling CF practices in the country in order to increase their effectiveness beyond numbers of farmers trained and engaged in demo plots.

One distinct feature of CF is that it reduced demand for labour especially for land preparation and weeding on women and children who traditionally bear the burden of labour in the smallholder sector. Women felt there was now time to rest for farmers practicing CF, This enabled children to have more time to study and play. The women practicing CA could now engage in small business, value add and market their produce.

There is need to consider **economies of scale** to bring about change at the household and community level for example a "foundation package" with potential to make a real difference would have been more appropriate for this supervised pilot phase. A foundation package allows one to produce enough to repay loans, retain sufficient for own consumption and a saving to re-invest in inputs for the next season. CF promoters should work out basic foundation packages for the different categories of farmers in order to offer a menu of options. From the stakeholder consultations it

was evident that an average smallholder family can handle plus or minus 3 ha of conventional cropping using draught animals.

3.2 Key result 2

Objective 2: Supply/availability of CA tools and equipment to farmers in target districts and Kenya enhanced in general (by stimulating and facilitating private sector interest and capabilities in manufacture, retailing and hire of CA tools and other inputs)

3.2.1 Key Result 2.1 Achievements

Local artisans and farm implement manufacturers are willing and able to fabricate CA tools and equipment. The Objectively Verifiable Indicators for this Key Result area were:

1. More (>10) local private sector manufacturers/traders seeking information on CA equipment supply from/through the project
2. >5 targeted companies (large and small) start producing/supplying CA equipment

There were very few farmers owning

There is limited supply of the CA equipment by the private sector. Approximately 200 units of rippers, sub-soilers and shallow weeders have been produced been locally produced manufactured and purchased by local private sector. Mass production has been hindered due to economically demand levels. Efforts to direct arising demands to known CA manufacturers have been upheld. Current CA equipment locally manufactured though in small quantities include: Rippers, sub-soilers, shallow weeders, pedestal sprayers, Animal drawn boom sprayers and jab planters

3.2.2 Key Result 2.2 Achievements

Service providers, including local traders and suppliers, support CA adoption through the supply of CA required inputs (seed and equipment). The Objectively Verifiable Indicators for this Key Result area were:

1. 20% of local commercial stockists in target village supplying CA equipment, tools and other CA relevant inputs, e.g. cover crop seed
2. CA equipment available on local market at affordable prices
3. 2 commercial contract arrangements in preparation between CA equipment manufacturers in Brazil and Supplier/Manufacturers in Kenya for the importation and supply of CA equipment in Kenya to supplement local manufacturing

There is great enthusiasm by equipment and input suppliers in the CA sector. These include the Rift Valley Institute of Technology and Pannar. Others include FEIL and Brazafric who are already importing Brazilian equipment into Kenya, including minimum tillage, direct seers and sprayers targeting large scale farmers. However,

there is duality that exists between these suppliers and the smallholder farmers. The farmers would like to own the equipment but they claim that the cost is prohibitive. On the other hand, the equipment and input suppliers are looking for effective demand, which they claim is low for mass supply.

To get out of this problem, the demand for equipment has to be high enough for suppliers to produce or import enough equipment to be able to offer discounts. This can only be achieved through initially providing smallholder farmers with subsidized equipment to create mass demand, and then exit gradually to ensure continued growth in demand and reduced cost of equipment.

3.2.3 Key Result 2.3 Achievements

More farmers accessing CA equipment through local hire-services. The Objectively Verifiable Indicators for this Key Result area were:

1. At least 25 private DAP and tractor equipment hire service points/units functioning
2. At least 5 private tractor equipment hire service points/units functioning with commercial hiring services
3. Number of farmers accessing CA equipment through commercial hiring schemes is doubled
4. The number of commercial hire schemes is 2 per project district

The DAP target was easily achieved through intensive training on CA equipment through a practical equipment handling and business oriented approach. About 40 private DAP hirers have been trained (5-17 Oct 2009) to facilitate timely accessibility and affordability of CA equipment services across the project districts. The number of DAP hires is however not sufficient as well as not well distributed for mass availability to CA farmers and the potential CA adopters. The farmers also complain that the cost of hiring the CA equipment is high. So far through CASARD only four (4) private tractor equipment hirers are functioning.

3.2.4 Challenges

While there was stakeholder support and belief in the potential of CF to improve smallholder livelihoods, the evaluation team observed a number of issues and challenges that impacted on the effective use of the FSP and CF training in the pilot project and smallholder sector as a whole.

- Poor operator understanding and slow advancement in learning about the equipment adjustments and operational optimals including seed quality e.g. non-graded hand-planting seed used for machine planting, planting depth etc.
- Direct-seeder difficulty in cutting through mulch especially where the only trash is maize stover.

- Haulage of the long beam animal drawn direct seeder (commonly referred to by farmers as the Fitarelli) with donkeys. This unit was designed for oxen.
- Lack of draft animals. In many areas farmers have resorted to manually hauling the low-draft power direct seeders.
- Direct seeders not having the range of seed-plates necessary to produce the right seed population. Hirers under pressure to cover more land have gone out of their way to have aluminum seed-plates produced by local industry. In several cases the plastic seed plates that come with the machines form Brazil have been ripped by the un-graded seed that may have stones in it.
- Some revelations are such as Some statutory requirements such as dealers paying taxes for spare parts or manufacturers paying the same for raw materials, at the point of entry (before selling or manufacturing – respectively) have been reports as detractors to business venture and communication with Brazil suppliers.
-

Lessons

4.0 Conclusions

From the quantitative impact surveys and consultations with farmers and other stakeholders e.g. government extension services, the evaluator concluded that:

- There are significant yield increases in maize in the two year project period attributable to CA practices. However farmers appreciated the contribution of legume rotation in terms of access to a food crop during the critical food shortage period and for increased soil fertility.
- There was some significant increase in area brought under CA practices beyond the promotional Farmer Field Schools plots through adoption by a section of FFS farmers. Further more there was some evidence of spontaneous adoption of CA package in the participating communities.
- CA requires a long incubation period for tangible results to be achieved. The initial direct and opportunity cost for CA is high, but subsequent costs are lower. For example, a smallholder farmer requires more herbicide at the beginning, once obnoxious weeds are wiped out, less herbicide is needed. Crop residue which would otherwise be used as animal fodder is used as soil cover, at the beginning, this may seem like a huge opportunituy cost to the smallholder farmer, but as the crp yields increase, the opportunity cost is lower. This period is lengthened by occurrence of drought which wipes out the benefits of CA.
- The CA package entails reduced labour for land preparation and weeding which is a benefit to women and children. Traditionally, land preparation and weeding is largely borne by women and children in the smallholder sector. The freed labour for children gave them more time to study and play, while women had enough time to engage in other small business, value adding and marketing of their produce.
- CA farming is limited to food crops as opposed to cash crops. There is need to identify appropriate cash crops for inclusion in CA farming for increased profitability and sustainability.
- Most farmers did not own CA equipment and often, they had to wait for a long period to be able to hire one. The farmers alluded the low availability of equipment to the high cost of equipment and lack of credit to purchase them.
- Most farmers complained that hiring CA equipment was rather high. Some of the equipment hires also charge exorbitant prices for spraying herbicides thus discouraging many potential CA adopters.
- Increased knowledge of CA is not a necessary but not a sufficient condition for farmers to adopt the technology and increase productivity and incomes. To support increase in knowledge about CA, a range of sustained investments over the initial adoption in CA and changes in policies and institutional arrangements are necessary to support wide spread adoption of CF technologies. Sustained contact and training in CA for attitude change will trigger changes in ways of farming in smallholder communities.

5.0 Recommendations

The evaluator offers recommendations that are designed to improve understanding of conservation agriculture/farming and its widespread uptake in the smallholder sector.

Recommendation 1
Increased Commercialization of CA Farming to increase Sustainability and Attractiveness of CA
Currently most CA activities are based mainly on subsistence/food crop. In order to increase commercialization, there is need to identify suitable cash crops for increased commercialization of CA production.

Recommendation 2
Facilitation for collective action and change is the key ingredient There is need to encourage collective action in areas such as value addition and marketing of agricultural produce for sustainability.

Recommendation 3
There is scope for donors to support the development of dedicated monitoring and learning capacities in order to build an understanding of the key drivers of CA adoption and how land tenure and traditional authority and practices facilitate or constraint the adoption of practices designed to improve productivity and livelihoods in the smallholder sector. This would further strengthen collaborative ways of working between different platform stakeholders.

Recommendation 3
There is need to commission a study to understand the opportunity costs and trade-offs a smallholder farmer experiences while adopting CA.

Recommendation 4
There is need to wave taxes on CA equipment and raw materials to reduce the cost of the equipment. Most of the farmers complained that the cost of equipment was rather high for them to purchaser.

Recommendation 5
There is a need to commission a study to evaluate the current charges for hiring equipment and purchase of chemicals.

Recommendation 6
Most of the farmers indicated that they have no access to credit to purchase CA equipment. There is therefore need to explore ways in which local banks can avail credit to at reasonable rates to enable them to purchase the equipment. This can be initiated through the Ministry of Agriculture.

6. Appendixes

6.1 Terms of Reference: CA-SARD project M&E impact study

I. INTRODUCTION

The African Conservation Tillage Network (ACT) in partnership with Food and Agriculture Organization of the United Nations (FAO), and Kenya Agricultural Research Institute KARI are involved in the implementation of Conservation Agriculture Project (CA-SARDII) in Siaya, Bungoma, Nakuru, Mbeere and Laikipia districts in Kenya. The project is being implemented through the farmer field school FFS approach with each district having an average of 10 FFS comprising of 25-30 farmers. The extension wing of the ministry of agriculture MoA are the direct implementers of the project on the ground in collaboration with local partners.

The purpose of CA-SARD project is to contribute to the promotion of growth and improved food security in Kenya through the scaling up of conservation agriculture (CA) as a sustainable land management (SLM) tool.

CA-SARD project has been implemented in the 5 districts since 2004 with phase 1 ending in 2006 and 2nd phase starting from 2007 to 2010. In both phases, emphasis has been put in using the farmer field school approach to introduce the technology to the farmers then focus on individual farmer adoption afterwards. The groups targeted in phase 2 are different from those involved in phase one hence there exist a critical mass in every district of farmers exposed to CA technology. The project approach has been holistic in articulating cross cutting issues complimenting adoption of CA technology by smallholder farmers. These include involvement of private sector especially the input supply chain, CA implement supply chain, agro-processing and market access. Since its inception, the project has played a critical role in providing a benchmark and lessons for establishment of new projects by new players in the agricultural sector. It is based on the above multi-diversity nature of the project that the project coordination team have agreed to carry out M&E impact study to map out the extent of adoption of CA in the country and specifically in the project districts.

Specific tasks

Under the overall technical supervision of the M&E officer, the study consultant will undertake the following;

- Determine how many CA - FFS groups established in both phase 1 and 2 and by interacting with group members, district coordinating team and National Project Coordinator establish the adoption extent in every district.
- Identify the most preferred CA option adopted by farmers under various AEZ and reasons for success and challenges.
- Inventorize at national and local level key institutions/projects involved in promotion of CA as a result of interaction with CA-SARD with specific emphasis on the location, what they do, target group and outcome.
- Map out the input supply chain and determine accessibility and affordability of farm input to the target group.
- Map out the CA implement supply chain with specific emphasis on the key players involved, utilization of the implement by the groups and individual farmers, hire service provision by local entrepreneurs, accessibility and affordability.

Expected output

- Number of farmers reached through the CA farmer field schools by gender, village and age group (Phase 1 and 2)
- Number of CA adopters for each FFS group by gender, village and age group.
- Analysis of most preferred CA options adopted by farmers.
- Synthesis of challenges and successes of CA adoption
- Data base of national and local level key institutions/projects involved in promotion of CA (NGOs, Government agencies,CBOs, equipment manufactures, input suppliers, training institutions,projects)
- Gross margins for selected enterprises under CA.

Deliverables

- Submission of data collection methodology and tools.
- Presentation of the preliminary findings of the study.
- Submission of zero draft reports
- Submission of final Detailed study report

Requirement

- A minimum of Msc in agriculture or related field.
- Practical experience in data analysis software packages (SPSS etc)
- More than 5 year experience in rural development initiatives involving data collection analysis and reporting.
- Excellent communication skills especially in English and Kiswahili
- Experience in Conservation agriculture would be an added advantage
- Experience in Farmer Field School (FFS) approach would be an added advantage
- Computer literate (Microsoft suite)

Consultancy duration breakdown

Activity	**Days**
Development of data collection tools	1
Briefing/consultation/debriefing sessions with ACT and NPC	2
Field work – collecting information and local stakeholders (4 days per district * 5 districts plus travel)	20
Meeting/interviewing key stakeholders at national level	2
Report compilation	5
Total	30 days

6.2 Technical annexes

6.2.1: Expanded Log frame

Project Title: Conservation Agriculture for Sustainable Agriculture and Rural Development – CA for SARD PHASE II

Narrative summary	*Objectively Verifiable Indicators*	*Means of Verification*	*Assumptions and Risks*
DEVELOPMENT OBJECTIVE Improved socio-economic growth, food security and livelihoods in Eastern Africa (and Southern Brazil) through Conservation Agriculture based interventions	1. Number of food deficient months reduced from over 3 months in year 1 to under 1 month in year 3 among practising households 2. Farming based h/hold incomes stable and doubling in at least 50% of the adopting h/holds by year 3 3. CA based small scale manufacturer industry sector increased sales for export to East Africa as well as consolidates local markets. 4. Partnership arrangement between privates sector of both regions (Southern Brazil/East Africa) in place	• Project reports and Government statistics ▪ manufacturers records of local and export sales ▪ exchange documentation	No natural disasters especially in form of extreme climatic seasons (droughts, floods)

Narrative summary	*Objectively Verifiable Indicators*	*Means of Verification*	*Assumptions and Risks*
Immediate Objectives 1. Adoption of profitable conservation agriculture practices by smallholder farmers in Kenya and Tanzania expanded 2. Supply/availability of CA tools and equipment to farmers in target districts and East Africa enhanced in general and specifically through improved networking from Brazil to East Africa (by stimulating and facilitating private sector interest and capabilities in manufacture, retailing and hire of CA tools and other inputs – and through facilitating enhanced private sector and institutional interaction between East Africa and Brazil) 3. Strengthen institutional mechanisms (including consolidating ACT) to stimulate and sustain knowledge sharing and to foster active government support, farmer innovations and in general up-scaling of CA in the two project countries, in the Region and beyond	1. Area under CA has further increased by at least the following: 200ha by end of year 1; 450ha by end of year 2; 1000ha by end of the project, i.e. year 3 2. No. of farmers practising CA at end of year 1 > 800; end of year 2 > 2600 and > 4000 at end of year 3) 3. Percentage of farmers participating in CA FFS that are applying promoted CA options (year 1 > 75%; year 2> 80%; year 3 = 85% 1. Demand for CA tools (various types) satisfied at affordable prices and in good quality by local private sector 2. Production of CA implements and tools within the region reaches at least 300 units at project midterm (1.5 years) and 1000 units by end of the project period 3. Appropriateness of design and quality of locally manufactured CA implements and tools confirmed including through farmer/user satisfaction 4. Type and numbers of CA equipment being made locally (in the region) *(to stimu-*late and sustain knowledge sharing):* Number and type of interactions per year on sharing CA/SLM knowledge involving different stakeholders and players, e.g. farmers, artisans: At least 10 CA/SLM knowledge sharing events/interactions (meetings, workshops, written communication, articles) up-loaded on the website as well as farmer stories disseminated. At least an additional 10 such types of interaction disseminated in year 2 and year 3 1. *(to foster active government support I): (a)* Governments of Kenya and Tanzania commit/second required staff (national coordinators and group facilitators) to project; (b) Government officers (from central and local levels) attending CA SARD field events and awareness meetings (year 1 to year 3 ongoing) 2. ACT secretariat competence in CA Knowledge management enhanced through staff support 3. *(To foster farmer innovations)* Type and form of farmer innovations captured on-farm through the field M&E process. Approx.: 10 innovative ideas are documented after year 1; and additional 10 in each of the following years 2 and 3 4. *up-scaling of CA in the two project countries, in the Region and beyond:* Evidence of adoption of CA spreading outside the primary target groups/villages. At least 200 households outside project support influenced to adopt CA at midterm; at least 500 households at end of year 3.	Project reports CA-FFS record forms CA-FFS purchase CA equipment from local sources in increasing numbers in the course of the new project phase website updates Articles available Farmer stories published Memorandum of understanding between gov. and project implementing teams project staff working Innovations documented through M&E-L process Requests to ACT and private sector from 'independent farmers' as regarding information and inputs	
Objective 1: Adoption of profitable conservation agriculture practices by smallholder farmers in Kenya and Tanzania expanded			

Narrative summary	*Objectively Verifiable Indicators*	*Means of Verification*	*Assumptions and Risks*
Outputs			
1.1 CA FFS participating farmers experimenting with CA using the FFS approaches and applying adapted CA practices in own plots	1. At least 200 new FFS groups established and functional (with over 4000 new households participating; 40 in year 1; 90 in year 2 and 70 in year 3 2. Within the first 6 months of year 1, each FFS group define main CA options for experimentation/adaptation in their area 3. Over 80% of the participating households applying defined CA options in own private plots	Project Progress Reports FFS records Local Agricultural Office Reports M&E reports	
1.2 Farmers more knowledgeable on CA and learning and applying CA practices into viable farming enterprises	4. 70% of Farmers can explain and interpret farming related land degradation cause-effect issues 5. Target farmers groups/communities streamline SLM/CA among their priority development issues and demanding/highlighting appropriate government/donor support in related programmes. Number of CA-FFS requests to district development plans for assistance and support in SLM/CA issues is doubling up to year 2 and tripling at year 3.	Project Reports FFS records and accounts Local Agricultural Office Reports M&E reports	
CA FFS graduate farmers organised in CA-SLM innovation networks stimulating collective SLM/CA responsibilities, enhanced social learning and widespread CA adoption (scaling out)	2. 90% of the graduated FFS groups are organised by themselves into self-sustaining farmer innovation/learning national network. This means > 100 FFS groups in year 2 and > 200 FFS groups at year 3.	Project Reports FFS records Local Agricultural Office Reports M&E reports	
Objective 2. Supply/availability of CA tools and equipment to farmers in target districts and East Africa enhanced in general (by stimulating and facilitating private sector interest and capabilities in manufacture, retailing and hire of CA tools and other inputs)			
Outputs			
2.1 Local artisans and farm implement manufacturers are willing and able to fabricate CA tools and equipment	3. More (>20) local private sector manufacturers/traders seeking information on CA equipment supply from/through the project 4. >10 targeted companies (large and small) start producing/supplying CA equipment by end of the project's 2nd year	• Records of manufacturers • Publications • Reports of farmer groups • Supervision and review reports • External evaluation • Reports on meetings between stakeholders	
2.2 Service providers, including local traders and suppliers, support CA adoption through the supply of CA required inputs (seed and equipment)	4. 20% of local commercial stockists in target village supplying CA equipment, tools and other CA relevant inputs, e.g. cover crop seed 5. CA equipment available on local market at affordable prices 6. 4 commercial contract arrangements in preparation between CA equipment manufacturers in Brazil and Supplier/Manufacturers in East	• Database of suppliers maintained by the project • Publications • External evaluations	

Narrative summary	*Objectively Verifiable Indicators*	*Means of Verification*	*Assumptions and Risks*
	Africa for the importation and supply of CA equipment in E/Africa to supplement local manufacturing	• Reports of farmer groups • Supervision/monitoring and review reports Reports on meetings between stakeholders	
2.3 More farmers accessing CA equipment through local hire-services	5. At least 30 private DAP and tractor equipment hire service points/units functioning at the end of Year 1 and 20 annual additional ones in Year 2 and 3 in DAP/Tractor active communities 6. At least 5 private tractor equipment hire service points/units functioning with commercial hiring services at end of Year 1 and 5 annual additional ones in Year 2 and 3 7. Number of farmers accessing CA equipment through commercial hiring schemes is doubling by end of year 2 and has further increased by end of year 3. In absolute numbers this means: The numbers of commercial hire schemes increase from 1 per project district to 2 in year 2 and to 3 in year 3.	• Publications • Reports of farmer groups • Supervision and review reports • External evaluation of the existing documents • Workshops and learning events' report supervision and review reports • Reports on meetings between stakeholders	
Objective 3: Strengthen institutional mechanisms (including consolidating ACT) to stimulate and sustain knowledge sharing and to foster active government support, farmer innovations and in general up-scaling of CA in the two project countries, in the Region and beyond			
Outputs			
ACTs institutional networking capability strengthened (*knowledge management expertise, more contacts and membership in region including at farmer level; active links to NEPAD, focal persons in Ke/Tz governments, etc*…) as framework for enhanced CA knowledge generation and sharing	1. Membership to ACT from within the region (East Africa) rises by at least 300% by the end of the project. (From currently 200 to 400 by end of first year to 600 at the end of year 2 and >800 by end of year 3 2. Networking interactions between CA-SARD II and other CA initiatives through participation in at least 3 workshops/events per year (organised by CA SARD or other institutions) 3. Additional staff (knowledge management and IT personnel) engaged at project regional office 4. Quarterly meetings between ACT and Ke/Tz government focal persons 5. Record of interactions of ACT with NEPAD and resulting actions; especially: Nepad/TerrAfrica related projects jointly carried out (3 meetings per year) 6. Approx 500 persons per year participate in organized exchange programmes>	• Project Progress Reports • ACT membership Register • ACT progress reports • Staff contracts • Meeting reports • Meeting reports • Reports	

Narrative summary	*Objectively Verifiable Indicators*	*Means of Verification*	*Assumptions and Risks*
CA SARD II lessons and evolving knowledge on CA adaptation/innovation processes and technological best practices including impact/effects on livelihoods and environment captured and shared	1. Farm level participatory M&E systems integrated in farmers' FFS learning process and 65% of FFS group members applying the system in own private field in year 1; 80% in year 2, 90% in year3 2. CA adaptation/innovation processes and technological best practices documented. 3. Information shared in target specific forms (including electronic, purpose literature materials, in farmer discussion/learning fora, etc..) reaching 1000 persons in y1, 3000 persons in y2, 9,000 in y3	• Impact assessment reports • M&E/L Reports • • Project Progress Reports • FFS group reports and case documents	
Governments of Kenya and Tanzania expressing active support for, and commitment to, CA/SLM promotion	1. Kenya and Tanzania Governments prioritise sustainable natural resource management, in line with CA principles documented in official government strategy and policy papers. 2. Governments recognise CA in the efforts to revitalise agriculture in addressing food insecurity, poverty and environmental degradation documented in official government strategy and policy papers. 4. CA/SLM (incorporating related NEPAD/TerrAfrica objectives) streamlined into Government food security, poverty alleviation and environmental management strategies, e.g. in the ASDP, PRSP, and TDV2025 in Tanzania and the SRA in Kenya.	• Government official policy/strategy documents • Project progress reports • policy papers available • documents available	
ACTIVITIES			
Output 1.1: CA FFS participating farmers experimenting with CA using the FFS approaches and applying adapted CA practices in own plots			
ACTIVITIES			
1.1.1 Villages/farmer communities for establishing 220 new CA-FFS in Kenya and Tanzania are identified	• Villages/communities for the FFS group sites identified and initial contacts made with all relevant players/stakeholders	• Situation/Problem analysis report • Leadership and governance framework/ leaders in place • Training Reports • Farmers' own accounts • Project Progress Reports	
1.1.2 Groups established/identified and the ground breaking exercise is facilitated including an in-depth systematic diagnostic/problem analysis	• The initial set of FFS groups (i.e. two-thirds of the total) established; • Groundbreaking exercise done • All groups go through in-depth diagnostic/Problem analysis and reports produced		
1.1.3 Provide support/training to the groups on key mobilisation and farmer organisation issues (e.g. leadership training)	• Training provided to all the groups in group dynamics and community leadership. All group member attending		
1.1.4 Conduct training for new group/	• 80 extension staff trained in CA and FFS		

Narrative summary	*Objectively Verifiable Indicators*	*Means of Verification*	*Assumptions and Risks*
district facilitators in CA and in FFS	• trained/skilled FFS facilitators are supporting FFS		
Output 1.2: Farmers more knowledgeable on CA and applying CA practices in viable farming enterprises			
ACTIVITIES			
1.2.1 Through demonstrations, group analytical exercises/discussions, exchange visits, expert talks, etc… facilitate farmers into critical awareness and understanding causes and implication of land degradation	• Activities (at least 10 expert talks conducted in each FFS and at least 3 exchange visits over 3 year period) undertaken to raise farmers' critical awareness of NRM issues • Farmers' competence in analytical tools for evaluating/assessing SLM/CA/NRM issues (problems and solutions) • Farmers planning own NRM/CA interventions • At least 50 field days/demonstrations conducted in each country over three year period	• Project records • FFS records • Mission reports and recommendations • Field day activity reports • Project Progress Reports • Technical Backstopping Mission Reports	
1.2.2 FFS groups supported in setting-up and running on-farm experiments as part of the technology adaptation and innovation process	• At least one on-farm experiment on local CA problems set up per FFS/season		
1.2.3 New CA-FFS groups facilitated to go through the CA curriculum with relevant and timely technical and material support (seed, implements, etc…)	• Farmer groups conduct learning meetings at regular interval and complete the curriculum • Seed (10 kg cover crop seeds per FFS), CA equipment (5 jab planters and one Dap no-till seeder per FFS) and other materials supplied to the farmer groups to aid the learning		
1.2.4 Training and support in business and entrepreneurship development (including aspects such as selection of crops with potential market and "good" price)	• At least 80% of all farmers in the FFS groups trained in business and entrepreneurship development • Report from each FFS group on analysis and identification of crops with the most market opportunities and best potential price in the area evidence from gross margins among the target households		
Output 1.3: CA FFS graduate farmers organised in CA-SLM innovation networks stimulating collective SLM/CA responsibilities, enhanced social learning and widespread CA adoption (scaling out)			
ACTIVITIES			
Provide technical backstopping and information support for	• Organise at least 3 technical backstopping encounters per group per year • Information (written) materials provided to the groups • Each CA SARD I group is registered with the country farmer association	• Project records • FFS records • Mission reports and recommendations • Field day activity reports	

Narrative summary	*Objectively Verifiable Indicators*	*Means of Verification*	*Assumptions and Risks*
attaining scaling up/out objectives in existing (CA SARD I) CA-FFS groups Stimulate and facilitate through information support, the networking linkages among the CA SARD I FFS groups and with other organisations (e.g. KENFAP in Kenya and MVIWATA in Tanzania) Facilitate field days (at various levels) and farmer exchange visits Support farmers in building knowledge and	• CA SARD I groups organise themselves into district level a "FFS Friends of the Earth" Network • Each CA FFS group hold at least one field day per year • Each CA FFS group make at least one exchange visit per year • Over 80% of the CA FFS group members get training in assessing and decide on viable farm business arrangements • Evidence of farmers making and taking up viable business arrangements related to their application of CA	• Screening reports	

Narrative summary	*Objectively Verifiable Indicators*	*Means of Verification*	*Assumptions and Risks*
competency in making informed business and entrepreneurship assessments and decisions			
Output 2.1: Local artisans and farm implement manufacturers are willing and able to fabricate CA tools and equipment			
ACTIVITIES			
Develop and sustain database of manufacturers (or potentially) of CA equipment in Kenya-Tanzania and in Brazil	• Website-based Manufacturers Database developed and made accessible to CA FFS groups through hard copy prints • Database up-dated after one-and-half years into the project	• Demand assessment Report • Study Tour Report • Project Progress Reports • Manufacturers database	
Stimulate and interest tools/equipment manufacturers to participate and interact with farmers in field/equipment demonstrations and field days and on-farm testing exercises	• Number of CA equipment manufacturers invited/participating in field days/demons • At least one manufacturer per country participates and supports on-farm equipment testing experimentation		
Facilitate linking of selected manufacturers and dealers in East Africa with manufacturers of CA equipment in Brazil and facilitate discussions on possible local manufacture under license	• At least two manufacturers in E/Africa sustain their own linkages with CA equipment manufacturers in Brazil • Manufacturers on both sides are more informed on requirements/conditions for under license manufacturer of Brazil equipment in E/Africa • Brazilian manufacturers sensitisation workshop conducted		
Provide information support to potential importers on local import regulation and taxes	• User friendly compilation of import regulation/taxes and viability information • Number of traders receiving the compilation		
Assess potential demand for CA equipment including farmers' ability and willingness to purchase the equipment	• Study undertaken in Ke/Tz during the 2nd half of Year 1 • Study Report available/distributed • One study tour of E/Africa manufacturers visiting Brazil conducted: 8		

Narrative summary	*Objectively Verifiable Indicators*	*Means of Verification*	*Assumptions and Risks*
Facilitate study tours of CA equipment manufacturers and policy support stakeholders from East Africa to Brazil and private sector stakeholders from Brazil to East Africa	manufacturers/traders involved • One follow-up study tour of Brazil manufacturers/suppliers to E/Africa conducted: 8 manufacturers/traders involved		
Output 2.2: Service providers, including local traders and suppliers, support CA adoption through the supply of CA required inputs (seed and equipment)			
ACTIVITIES			
2.2.1. Undertake study to highlight lessons on CA equipment development, manufacturing and supply, on one side, and increased farmer accessibility, on the other from the Brazil experience	• Study undertaken (Brazil) and Report made available to E/Africa	• Project records • FFS records • Mission reports and recommendations • Field day activity reports • Project Progress Reports • Technical Backstopping Mission Reports • Leaflets/Posters Produced	
2.2.2. Share the lessons (meetings, individual encounters, distribution of study report, etc…) with potential service providers to help guide/stimulate positive decisions on CA input supply	• One meeting held in each country (Ke/Tz) with relevant stakeholders to share findings of the Brazil study • 400 copies of the Study report distributed in Ke/Tz		
2.2.3. Support the development of simple use/maintenance leaflets for the main CA equipments (in English and Swahili)	• Simple use/maintenance leaflets developed and printed (English and Swahili) • Over 2000 leaflets distributed through equipment selling points and at field days		
Output 2.3: More farmers accessing CA equipment through local hire-services			
ACTIVITIES			
Train/Expose operators to CA equipment including on aspects of efficient operation, maintenance, storage and safety	• At least one CA equipment operator per CA FFS group is trained in equipment use, maintenance and storage/care • Number of operators trained as trainers	• Project reports and records • Field days reports and attendance registers	No socio/cultural resistance against women working with draught animals
Facilitate potential operators to undergo appropriate business	• All operating operators trained in equipment hire based business management		

Narrative summary	*Objectively Verifiable Indicators*	*Means of Verification*	*Assumptions and Risks*
management focusing on farm power hire services Develop and distribute register of CA equipment hire service providers Stimulate and facilitate participation of the hire service providers in on-farm/field demonstration days	• 50% of the trained operators offering commercial equipment hire services • District based Register/Database of equipment hire providers distributed to all CA FFS groups in the district • Number of equipment hire providers taking part in field days and demonstrations	• Training Reports • Equipment dealers database /Register	
Output 3.1: ACT's institutional networking capability strengthened (*knowledge management expertise, more contacts and membership in region including at farmer level; active links to NEPAD, focal persons in Ke/Tz governments, etc*…) as framework for enhanced CA knowledge generation and sharing			
ACTIVITIES			
3.1.1 Knowledge Management staff for the ACT secretariat identified and recruited 3.1.2 Pro-active ACT membership drive conducted including at farm level 3.1.3 Collaboration MoU signed with CA/SLM/ACT government focal persons 3.1.4 Participate in/contribute to NEPAD SLM programmes 3.1.5 Organise/conduct staff/stakeholder exchange/exposure visits	• Staff identified and recruited and in place • At least 500 new members from E/Africa recruited each year • 20% of the new members being farmers and farm level agricultural staff • Signed MoU with government focal person in Kenya/Tanzania • Kenya/Tanzania Nepad SLM meetings attended • Engagements with the national SLM teams in the two countries • Type and form of CA SARD II inputs to the country SLM/CAADP strategic plans • One visit of key policy persons to Brazil conduced • One in-country stakeholder visit to CA sites organised • One regional study tour per year; two national study tour per year conducted (for CA SARD II staff and lead farmers)	• Project Progress Reports and performance records • Mission reports and recommendations • MoU Document • Technical Backstopping Mission Reports • Leaflets/Posters Produced	
Output 3.2: CA SARD II lessons and evolving knowledge on CA adaptation/innovation processes and technological best practices including impact/effects on livelihoods and environment captured and shared			
ACTIVITIES			
3.2.1 Implementation of the M&E to capture evolving knowledge and facilitate social learning on CA	• Facilitators and participating farmers trained in the M&E/L exercise • M&E/L checklist supplied to all CA FFS groups • Framework for easy documentation and sharing is in place	• M&E scheme records • final workshop report (first phase) • Documented lessons learnt	

Narrative summary	*Objectively Verifiable Indicators*	*Means of Verification*	*Assumptions and Risks*
application (effects/ impact on environment and on livelihood parameters)	• M&E/L synthesis reports produced quarterly • Each CA FFS group conduct the mid- and end-of-season evaluation/learning meetings	available from regional office • Mission reports from participating farmers and compiled report from NPC	
3.2.2 Compile, synthesise and disseminate relevant (CA) information and experiences from within the region	• At least one CA case per district per year synthesized, documented and disseminated • Regional synthesis of evolving lessons compiled and disseminated on yearly basis	• Compiled documentation available as hard copy and on the internet • Database • Articles •	
3.2.3 Support/facilitate the documentation into target specific products information/knowledge from the CA SARD project (including technical and lobbying materials)	• Four technical/Information leaflets and four posters produced per year • 1000 copies printed and distributed to all CA FFS groups (English / Swahili copies) • SARD resource facility and ACT/FAO CA database are closely linked-up for mutual benefits and CA knowledge sharing		
3.2.4 Build and sustain mutual collaboration and networking with relevant NRM/SLM/CA initiatives in the region and beyond	• CA-SARD office takes on a strong networking and coalition building role on SLM/CA in the region • Key government, private sector, NGOs and donor initiatives collaborating with the CA SARD Project		
3.2.5 Conduct an end-of-project international workshops with project stakeholders including representatives from other initiatives (TerrAfrica, NEPAD, SCAP, SARD, Private sector)	• End-of-Project workshop held within the last six months of the Project • Type and numbers of stakeholders at the workshop		
Output 3.3: Governments of Kenya and Tanzania expressing active support for, and commitment to, CA/SLM promotion			
ACTIVITIES			

Narrative summary	*Objectively Verifiable Indicators*	*Means of Verification*	*Assumptions and Risks*
Provide information support to relevant government persons/departments to enable appropriate SLM/CA related decisions	• One meeting per year per country held to provide relevant inform to policy/relevant government staff • Number of copies of information materials distributed to policy/government staff	• Revised documents available at least in draft form • Meeting records	National policies analysts and decision makers are made aware of potential of CA for various technical fields
Conduct CA awareness meetings for government and civic leaders at various levels	• One meeting held in each district to sensitise local government, traditional and civic authorities/leaders on SLM/CA		
Support government in the documentation and streamlining of SLM/CA in national development strategies	• Technical input to government SLM/CA strategic and programme documents • SLM/CA Case study information/data offered to strengthen the case for SLM/CA streamlining • One Policy level briefing meetings per country conducted as part of advocacy policy change initiative		
Present and discuss CA/SLM and CA SARD project at all opportune government and other sectors fora	• Number and type of meetings (including those organised by others) at which CA SARD Project presents SLM/CA information/work		