

Conservation Agriculture in AFRICA: Analysing and Forecasting its Impact - Comprehending its Adoption



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CA2Africa seeks to assess and learn jointly from past and on-going Conservation Agriculture (CA) experiences under which conditions and to what extent does CA strengthen the socio-economic position of landholders in Africa. This will enable the identification of knowledge gaps for future research, development and promotion of CA. The project is carried out by a consortium of 10 partners, led by CIRAD, France
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General information

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Executive summary

Conservation Agriculture (CA) is progressively viewed as a promising option for coping with the need to increase food production on the basis of more sustainable farming practices. CA specifically aims to address the problems of soil degradation resulting from agronomic practices that deplete the macrobiotic matter and nutrient content of the soil. It aims at higher crop yields and lower production costs. It has however been viewed over time that the rate of adoption of the CA technology remains at a constant low. This project seeks to better understand the reasons for the limited adoption of CA in Africa. The goal is, therefore, to examine the agro-ecological, socio-economic and institutional conditions that determine the general success or failure of CA.

Conservation Agriculture as a technology will be evaluated and understood using a conceptual framework that differentiates the three scales of analysis namely the field level, the farm and village level and finally the regional level. Each scale has its own analytical tools or models. The project also aims at examining the interaction of the three scales, with emphasis on the most relevant linkages to explain CA adoption or rejection. The virtual significance of the different factors of adoption working at each scale, will be determined for each case study and will guide assessments and consequently the type of analysis to be conducted. The project brings together the major research players involved with CA in Africa to share, and appraise together with practitioners involved in past and ongoing experiences on CA, representing major agro-ecological zones and farming systems of Africa. It illustrates on a number of selected case studies from these regions to identify lessons and priorities for future research, practice and policy on CA in Africa. The integrated assessment of these case studies will be done mostly through the use of carefully selected bio-physical, socio-economic and innovation systems models.

This report summarizes the deliberations and findings of a two day workshop that was held at the SG Resort- Arusha on the 8th and 9th of September 2010. The event was attended by sixteen participants representing various agricultural organizations in the East Africa Region and Europe, they included: African Conservation Tillage Network (ACT), Tropical Soil Biology and Fertility Institute (TSBF/ AFNET), Agricultural Research for Development (CIRAD), LEIBNIZ-Centre for Agricultural Landscape Research (ZALF), Kenya Agricultural Research Institute (KARI), National Agricultural Research Organisation Uganda (NARO), Agricultural Research Institute (ARI) UYOLE, SELIAN Agricultural Research Institute (SARI-MAFC), Conservation Agriculture for Sustainable Agricultural and Rural Development (CA

SARD), FAO-JUBA, the Ministry of Agriculture (Kenya) and Kenya Network for Dissemination of Agricultural Technologies (KENDAT).

The main outcome of the workshop included the following;

- Participants were updated on the progress of the project at the regional specifically on case study selection and global level.
- Representatives from various agricultural organizations shared their experience on CA and soil fertility programmes
- Participants were introduced to the project database framework and they provided their direct input to be incorporated in the final version.
- Using experience from their own organizations and project implementations, participants filled in the model checklist and provided direct feedback for further improvement and customization of the model.
- The workplan for the regional platform activities and the next step of action were agreed upon by the participants.

Some participants who arrived early at the venue had the opportunity for a field visit to Karatu which is one of the selected case study district in Tanzania. While in Karatu, the participants met members of Mwangaza CA farmer field school (FFS) group in Rhotia village. Most members of the group and the surrounding community have adopted CA in their individual farms.

In conclusion, the event went well and all the objectives were realized.

1.0 Introduction

Background to the project

CA2AFRICA is a continental project that is funded by EU under the 7th Programme framework for a period of 30 months. The project effectively commenced in April 2010. The project is in operation across 5 regions in Africa namely: Northern, Eastern, Western, Southern, and Madagascar. The overall project coordination is undertaken by CIRAD while different partners coordinate activities in various work packages and regional platforms. In East Africa Region, the African Conservation Tillage Network (ACT) is the platform leader for the case studies and also the work package leader for networking and capacity building.

The overall project goal is to assess and learn jointly from past and on-going CA experiences under which conditions and to what extent does CA strengthen the socio-economic position of landholders in Africa. This will enable the identification of knowledge gaps for future research, development and promotion of CA.

The project aims at the following **specific objectives**:

- 1) An up-to-date knowledge and better comprehension of the impacts of CA practices in Africa (WP1)

- 2) The testing and validation of bio-physical, socio-economic and conceptual models of innovation systems for analyzing the impact and adoption of CA in Africa; (WP2, WP3)
- 3) The identification of pathways to make models readily applicable for decision-makers in different African regions and under different conditions; (WP3)
- 4) A strengthened network of the principal stakeholders and trained African researchers to promote CA research and development in Africa (WP4)

Workshop objectives

The main objectives of the workshop included the following;

1. Update the regional network members on progress of the CA2AFRICA (model, data base development) and other Conservation Agriculture initiatives in the region.
2. Work out strategies for data collection for case study development for the selected districts.
 - o Test the 1st version of the data base
 - o Discuss the modelling analysis and test the model checklist
3. Develop strategic interventions for the implementation of the East African platform activities.
4. Share with stakeholders and update the activities for networking within the East African platform on CA and integrated soil fertility management.

Workshop Deliverables

1. Shared progress reports and planned activities of CA2AFRICA and also of other CA/Soil fertility initiatives in the region.
2. Modified reference database (framework) for case study assessment of impact and adoption in selected districts.
3. List of guiding interventions, timelines, responsible and input requirement.
4. Action plans of endorsed regional networking activities.

2.0 Opening Remarks

The workshop began with a welcome address by ACT's Executive Secretary Eng Saidi Mkomwa followed by self introduction of individual participants and the institutions they were represented.

3.0 Summary of presentations

Presentation of ca2africa project progress (global platform)

The first presentation was given by Marc Corbeels from CIRAD, under the theme CA2Africa: Analyzing and Forecasting its Impact – Comprehending its Adoption. The focus of this presentation was to introduce the project and update the participants on the progress made so far. The main highlights of the presentation were;

- Recalling the main objective of the project ... “use *state-of-the art of Conservation agriculture in Africa for better understanding of impacts & adoption of CA through research & development needs*”.

- The project work packages, related activities and the implementing agencies
- The project implementation structure and governance
- Project milestones and key activities (both global and regional)
- Follow up project “ABACO” scheduled to start in 2011

Presentation of ca2africa project progress (East Africa)

The second presentation was made by Tom Apina of ACT, who expounded more on the objectives and deliverables of the workshop, and the highlights of the progress made in the implementation of activities for East Africa platform. Highlight of the presentation included the following;

- Case study site selection of Bungoma in Kenya and Karatu in Tanzania
- The case study sites were selected from the CA-SARDII project that is being executed by FAO and directly implemented by KARI and SARI in Kenya and Tanzania respectively.
- That the agro-ecological zones in both areas were diverse, and distinctive hence the adoption of CA was unique in both sites.
- That key regional partners to constitute the project stakeholders will be government agencies (SARI, KARI, ministries), NGOs, research institutions and the private sector players.

Reports from participating ca/soil fertility project partners on assessment of ca adoption and impact.

Dr Drake Mubiru of NARO Uganda shared with the participants his experience in soil fertility/ CA/NRM programme that he was involved in.

The target area for the Ugandan project was in the Northern part, which had been under occupation by the rebel groups for the last two decades. Therefore, the technology was constrained to IDP camps. In his project, he has come across varying challenges which included the following:

- The farmers’ mind set, which is focused on conventional farming.
- Small land parcels.
- Unavailability of edible cover crops which lead to the leaving of land bare, after harvesting.
- The lack of equipment, among groups.

KENDAT-INNOVAM experience

The Mwea horticultural based organization, Innovam, under the KENDAT umbrella body and following in its “*heshimu punda*” policy, focuses on being supportive of community based farming activities without profit. It also targets the elimination of middlemen in the purchasing of produce process, and the overcoming of dependence on donor aid. The project aims to facilitate self financing of activities pertaining to or involving agriculture. Among its objectives are:

- The mobilization of small holder farmers and the training on CA, as well as the establishment of demo farms for practical training.
- The setting up of an agro-vet shop to provide access to input resources.
- The supporting of farmer groups from the grass root level and the setting up of research and information sharing training.

Challenges faced:

- Financial constraints, where there is the lack of funding, deficiency of credit facilities, Land hiring through brokers which brings about heightened expense, a poorly structured buying office promotes the poorly enacted systems of purchase and sale of goods and weak security at farms as well as on vehicles in transit with produce to the market, leads to the loss of profit through cases of theft.

CA-SARDII; Dr Barack Okoba

In his presentation on carbon sequestration, Barrack Okoba stated that with high biomass production arising from CA, farmers are able to feed their livestock. In addition, CA can contribute to higher carbon sequestration and reduce downstream degradation due to the maintenance of soils structures.

MoA-Kenya: Wafula Mutoro

From the Ministry of Agriculture Kenya, Wafula Mutoro added that in Kenya there is the strategy for up scaling CA by the ministry in most parts of the country.

- That there is support from donor agencies and Agro-forestry institutions have been urged to grow indigenous crops.
- Extension capacity need to be expanded with further establishment of agricultural technology development centres where there is also the fabrication of agricultural equipment, and farmer training.
- Harmonization of stakeholders involved in the agricultural extension service provision.
- The Ministry of Agriculture with the Ministry of Environment developing a joint proposal on scaling up CA.

Discussion arising from the presentations

- Comparative analysis of two varying regions was a suggestion made in order to help monitor the adoption of CA in East Africa.
- Participants were informed that progress reports would be circulated to various stakeholders involved in CA.
- The type of models to apply in CA was a topic in which further discussion was to be held.
- It was noted with concern that there was not enough information material in distribution to enable the widespread diffusion of knowledge on CA.

Circulation of such material would go a long way in the infiltration of the technology among the communities in which CA is being transmitted.

- On inquiry as to why his program has shifted to progressive farmers rather than smallholder farmers, Dr. Mubiru cites economic constraints as being the cause. The types of farmers that CA targets, own small land parcels, which are incompatible with the manner in which inputs are sold. These inputs e.g. pesticides and fertilizers, are sold in whole units for instance, one bottle of pesticide, or bag of fertilizer per acre of land, thus limiting the purchasing power of such farmers. The focus on equipment lies in the hand operated types, or the animal drawn tools, which the farmer groups can be able to afford.
- Private investors should be encouraged to support sustenance of CA in Mwea. There is a huge challenge due to the 50-50 support of both parties' i.e. funding research and the funding of farmers. It was suggested that the initiative be supported fully and to the lowest level.
- On the matter of the allowing of livestock into a field after harvesting, Dr. Okoba recommended that farmers be advised to keep cover crops to avoid grazing into farming land and consequent destruction of the soil structure as well as maintain. In response to a question asked about sustenance of the crops using various bio-models, he affirmed that the use of quality seeds and the combination of soil humidity and proper agronomic practices, in each area and the temperature in the said regions was enough for full sustenance.
- Collaboration between partners should be identified early and enhanced, so as to provide the full realization of potential between both the farmers and the facilitators of the CA technology.
- There was deliberation on the basis in which the term smallholder farming is applied, in relation to respective regions in continental perspectives. Land sizes are relative to the CA concept, hence adoption of the technology and estimated production levels would be skewed or affected.

4.0 Database Presentation

About the Database

The 1st version of the project database was presented by the team from Afnet and participants were taken through and their inputs/feedback were taken up by the team for further incorporation and improvement of the database.

The project database was accessed by participants via the website:

[www://tabarinconsulting.com/projects](http://www.tabarinconsulting.com/projects)

Discussion

The participants commended the database development team for an initial comprehensive output. There was general consensus that the database had captured the key data requirements under the CA practices and projects.

Comments given

The following comments were given in order to improve the whole system:

- There is need to clarify on the contents under the meta-data as well as standardize the use of some terms/ headings adopted in the database also occur. For instance, words such as plots/ fields and farm had been used interchangeably used in the first three levels. This could cause confusion in the process of data entry. A glossary table defining the key terms should be considered for this problem.
- The participants noted that since most factors of the data are experimental, the database should have provision to upload/import data directly from this format into the database since this will significantly reduce the time of data entry and also control on errors arising during data entry.
- Climate data is fundamental to modelling. A recommendation was made for this type of data to be clustered together. The data should be linked to the respective weather stations by geo-referencing the stations using Global Positioning Systems.
- A recommendation was made for the database to have several string data that would open at the top of the respective sheets at different levels. Example of such data would include information such as location parameters (region, country, province), agro-ecology, names of farmers, etc
- The Case Study page will be replaced by the Checklist developed by Tim Ndah of ZALF. This will minimize on overlaps in data existence.
- The use of combo boxes/drop down menus was proposed to select parameters of interest and as a way to minimize data errors during entry.
- For ease and systematic data presentation, the participants recommended that the CA data be organized as per the various enterprises/cropping systems e.g. cereal-legume and with all the other data such as inputs, labour, outputs following. This structure should be adopted at filed, farm and regional levels.
- There exist various other databases e.g. WOCAT, previously developed for other projects in the region. Such databases can be reviewed to aid in refining, standardizing, organizing the parameters in this database.
- Issues of user rights and controls: User levels to be implemented such that different users have different levels of access. Users can edit/add data for a period of time after which they have to request for rights from the administrator to alter data.
- Put tabarin consulting link in CA2Africa site (www.CA2Africa.eu). There is now a logo for CA2Africa which shall be used in the database.

5.0 Checklist Presentation

The checklist was prepared by Hycenth Tim Ndah on behalf of his colleagues Johannes Schuler, Sandra Uthes and Peter Zandera of ZALF. (Leibniz-Centre for Agricultural Landscape Research).

Objectives of the checklist

1. Determining the rate of CA diffusion, while at the same time identifying the impediments to the adoption of Conservation Agriculture.
2. Having integrated questions to act as inputs, focusing on a holistic approach, into the societal structure, as well as the inclusion of regional issues that would be fundamental to the studying of adoption of Conservation Agriculture.
3. The monitoring of the influence of CA components upon the adopting society.
4. The creation of a CA2Africa database, which would be inclusive of collected data, case studies, names of organisations and people involved.

The checklist employs a cycle involving pre-modelling-modelling and post-modelling. The structure of the checklist involves the grouping of the questions which lie under the following categories: Object of Adoption (CA), Capacity of implementing organization, Attributes of Scaling up, Political/Institutional framework at Regional Level, Political/Institutional framework at Village Level, Economic Conditions, and the Community's attitude towards CA.

The purpose of the checklist is to serve as a tool through which data can be collected, through the conceptualizing of practical questions for capturing concerns, while engaging regional factors.

Each participant was given an opportunity to fill in the checklist with details about their own CA project/programme. The individual outcome of the exercise was given back to the Tim for further improvement of the checklist.

Concerns rising from the checklist

- The naming of the tool as CA2Africa was a concern raised, stating that it limited the application of the tool on a global level. A suggestion was made on making the tool universal: In response, the matter was addressed by stating that if this was done, then the tool would become too generic, and would not meet the objectives as targeted in the region of interest under the CA concept. In addition, the target farmer groups, is the main determinant of the tool as developed. The specific structuring of the questions addresses smallholder farmer groups and not large scale ones.
- There was a point of interest raised about the model testing and the type of data that would be compatible with the system. Bar economic models which

influence adoption and are compatible with societal demands were viewed as most fit.

- The particular theory to use and conceptual models was another issue brought forth in the understanding of the database. It was agreed that there is need for the application of adoption theories that would complement the generic model and the generation of questions in the innovation techniques, which would be assessed in a holistic approach. Taking climate change into consideration, through the biophysical model, there was more need to have flexible data to show limited adoption due to factors that could change over time. In response to this, it emerged that there is a proposal being developed by the Kenyan government and leading research institutes on counter measures. I.e. as one phenomenon is being dealt with, there is the prevention of others occurring.
- It was viewed that the checklist should undergo revision in order to minimize the room that it leaves for too much generalization.
- In events where data was lost, since there was not enough time or funding to begin the process of data collection anew, the checklist would provide summary models that do not need so much data in detail. Strategies to re-collect data would involve the engagement of interns to collect and feed in the data into the database. This process of data recollection would lead to the identification of gaps which would help in the solving of varying issues.
- The data base provides a set of questions at the regional and community levels which were to be skipped in order to accommodate the smallholder field levels. On input of data into the system, the database will enable administrators to choose the best and closest model in which the data can be measured. It also provides for restricted access and monitoring of any added inputs.

6.0 Way Forward

Steps to be taken in regard to the database

- The database will be revised as per the suggestions received from the project teams. Further interaction will also be held with teams from the other regions; West, North, South and Madagascar to ensure that views of all partners are captured and implemented in the final output.
- A revised edition of the database ought to be completed by the end of October and shared among stakeholders by early November, and comments on all CA workshops previously attended, incorporated.

Steps to be taken in regards to the checklist

- There will be the generation of an inventory form by Marc and circulated among the workshop participants at the end of the month, for comments and

added input. Once there is consensus on the form, participants will be expected to fill in the form, and then make a two page documentation of each project in order to enable them to be in touch with project events happening on the ground within the region. This would also help stakeholders identify other projects that can be started in relation to Conservation Agriculture.

The strategies and the calendar for data collection and data entry for the case studies in Kenya and Tanzania are as follows:

- Data entry will commence once the final database is uploaded, which is scheduled for the end of November 2010. The process will take one month and is expected to be complete by the end of December. Data from the field level will be used, as it is the first entry point at which most data lies. The sample case studies for the database trial will be narrowed to two, and data verifiability will be made by revisiting sites of the data collection. The data entry will be done with that which has been already collected as per the current time frame. Final responsibility will be assigned to ACT.
- The evaluation of the data in the system will be done by the end of January 2011, followed by the sharing of report findings at the next workshop scheduled for February of the same year, and improvement made on various sections. In this forum also, will be the discussing of the type of model and analysis system to use.
- Regarding cases where technical errors occurred and data was lost in the process, the checklist would help in the redeveloping of the tool for data collection. The engaging of interns to collect the data and feed it into the database would also be included in the course of action. This process of recollection of data will help in the identifying of gaps which may have been overseen, and help in the re-modification of the data base.
- Where there is not enough data to use, the checklist provides summary models which participants can use to capture the most important concepts of the data.



Annexes

LIST OF PARTICIPANTS

THE CA2AFRICA EAST AFRICA SUB-REGIONAL WORKSHOP Held at the SG Resort, Arusha Tanzania; September 8-10, 2010

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