



CA2AFRICA: Conservation Agriculture in AFRICA: Analysing and Foreseeing its Impact - Comprehending its Adoption

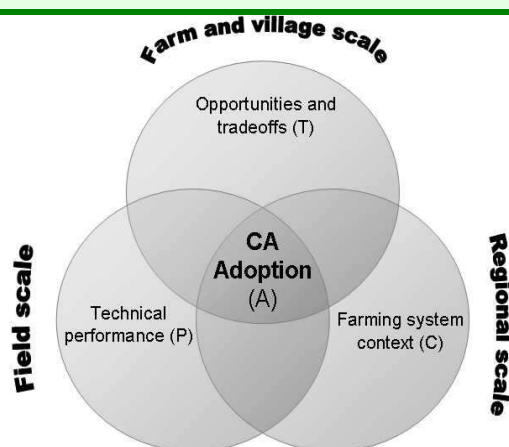
The project



Marc Corbeels, CIRAD
Project coordinator

CA2Africa www.CA2Africa.eu is an important EC funded project seeking to understand why Conservation Agriculture (CA) techniques have not been adopted widely throughout Africa. The results of the project will be used to tailor future CA efforts to local needs. The objective of the project is, therefore, to examine the agro-ecological, socio-economic and institutional conditions that determine success or failure of CA. The project brings together the major research players involved with CA in Africa to share, assess and learn together with practitioners from past and ongoing experiences on CA in five regions across Africa: Kenya/Tanzania; Southern Africa; Burkina-Faso/Benin; Morocco/Tunisia and Madagascar. It draws 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.

CA is analyzed and understood using a conceptual framework (see Figure) that distinguishes three scales of analysis. Each scale has its own analytical tools. At each scale, difficulties might emerge that impede, slow down or block the adoption process of CA. The relative importance of the different determinants of adoption operating at each scale will be determined for each case study and will guide our assessments and type of analysis. The reference framework is important in the sense that it will harmonise the conceptual approach given that CA experiences across Africa are very different and heterogeneous in nature.



$$\text{Adoption} = \text{Performance} + \text{Tradeoffs} + \text{Context} + (P \times T \times C)_{\text{interactions}}$$

Conceptual representation of the the determinants of adoption of conservation agriculture (CA) in African farming systems. Adoption (A) is conditioned by its technical performance (P), subject to the opportunities and tradeoffs (T) that operate at farm and village scales and constrained by different aspects of the context (C) in which the farming system operates, including market, socio-economic, institutional and policy conditions defining the innovation system and the variability inherent to the physical environment (e.g. climate change).



Participants at the inception workshop of the project

FACTS

Adoption of CA in Madagascar



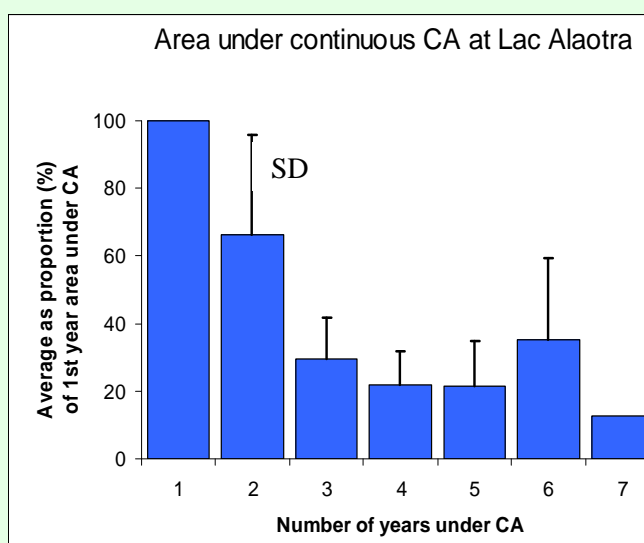
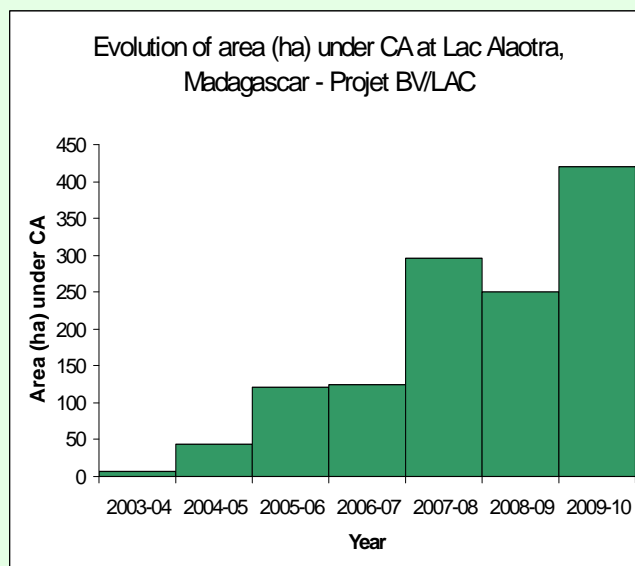
Eric Penot, CIRAD

With 100,000 ha of cultivated fields, the region surrounding Lac Alaotra is considered as one of the main rice-growing areas in Madagascar, known as the "rice bowl" of Madagascar. In 2003, a large project: "Development and protection of the watersheds of Lac Alaotra (BV/Lac)" was set up with the aim to increase agricultural production of smallholders in the region, whilst preserving the environment. One component of the project is the promotion and diffusion of Conservation Agriculture (CA) among farmers as a way to produce rice in a productive and sustainable way. In 2008, for example, the project provided technical CA training and support to about 1,000 farmers and covered a total area of 600 ha.

The project monitored from 2003/04 to 2009/10 the land surfaces under CA. This database represents a unique opportunity to estimate adoption rates by farmers, following a large effort of promoting CA in an agricultural development project. The results are shown in the Figures.



The area under CA increased steadily since the start of the project. In 2009/10 CA is practiced on more than 400 ha. After the first year when CA was installed on the fields, on average about 65% of the fields remain under CA in the year thereafter. However, in year 3 this figure drops to around 30%. The first and second year can be considered as the experimental phase, during which many farmers are trying CA. A high proportion of the farmers abandon the CA technique during this phase. The experimental phase requires a lot of investment (cash) and time of farmers, whilst profits from CA are not always immediately felt. Once farmers have gone through the experimental phase, the dropout rates are much lower and stabilize. During years 3-5 farmers have passed the experimental phase and have acquired the necessary knowledge to conduct CA. They have become actual adopters of CA.

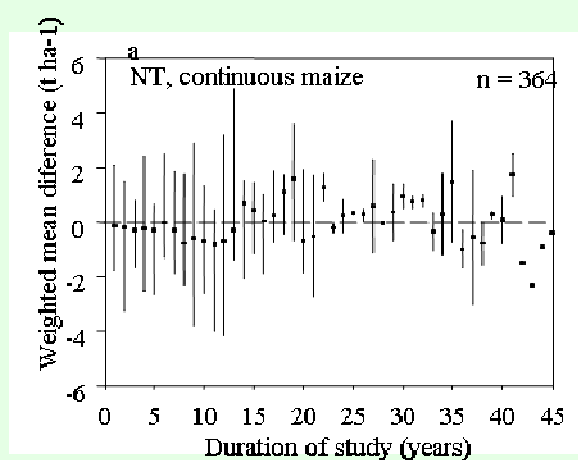


Long-term maize yield trends under CA: results from a meta-analysis



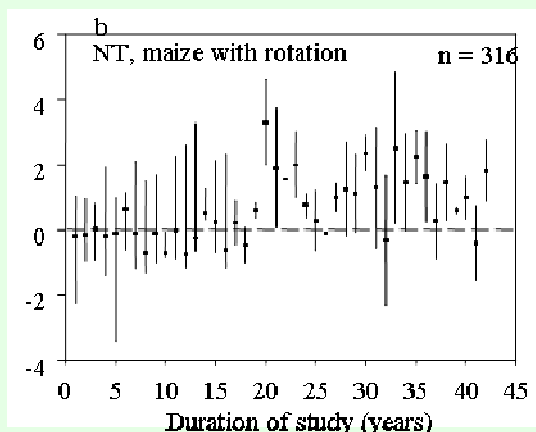
Leonard Rusinamhodzi, CIAT

A meta-analysis of published results from long-term studies on Conservation Agriculture (CA) under rainfed conditions in sub-humid and semi-arid regions clearly shows that maize yield benefits from CA are mostly realized in the long-term (> 15 years), - and when rotations are applied (see Figures). This may impede adoption of CA, since farmers in Africa often attribute a substantially higher value to immediate costs and benefits than those incurred or realised in the future, due to the immediate constraints of production and food security that they face.



Short-term yield effects from CA have been found to be variable (positive, neutral or negative yield responses). Further work is needed to identify the causes of the often-observed short-term yield reductions and how they can be avoided.

Source: Rusinamhodzi et al. (2011) Long-term effects of conservation agriculture practices on maize yields under rain-fed conditions: lessons for southern Africa. *Agronomy for Sustainable Development* (in review)



Weighted mean differences in maize grain yield over time between continuous no-tillage (NT) and continuous conventional tillage (CT) without and with rotation. Bars are the standard deviations.

Existing NETWORKS of the project

ACT - African Conservation Tillage Initiative

www.act-africa.org



Tom Apina, ACT
Head of M&E

ACT is a registered 'Not for Profit', voluntary membership Non Governmental Organisation whose headquarters are in Nairobi Kenya. While its headquarters covers the Eastern and Horn Africa sub-region, Harare serves as the Southern Africa sub-regional office and the West and Central Africa sub-regional office is in Ouagadougou, Burkina Faso. Current membership stands at 1200 individuals and institutions from 33 countries.

Among many, ACT's thrust is to add value through strategic partnership in the identification, adaptation and scaling up of Conservation Agriculture principles and practices. Knowledge and information management on natural resources management with farmers is the central focus for innovation. Lessons and experience on adaptation and adoption of Conservation Agriculture is one of the major activities that the organisation indulges in. ACT focuses on specific outputs which enshrine all sectors of rural development including, networking, creation of a Knowledge and Information Management Platform, promotion and dissemination of information support and finally, lobbying/ advocacy and public awareness, to mention a few.

ACT is currently implementing collaborative projects in most of the sub regions in sub Saharan Africa. Among those projects is the CA2AFRICA project where the organization is leading a work package on capacity building and networking. Other projects are the CA-SARD project implemented in Kenya and Tanzania funded by German Trust Fund through FAO; the SCAP project implemented in Burkina Faso, Guinea and Niger mainly funded by IFAD and partly by AFD; just starting, the ABACO project that is funded by EU and yet to be commissioned the BioCarbon Fund that is funded by world bank. All these projects are contributing towards strengthening ACT role as continental platform/network for promoting adaptation and adoption of Conservation Agriculture in the continent.

AfNET - African Network for Soil Biology and Fertility

www.ciat.cgiar.org/ourprograms/TropicalSoil/Pages/AfNet.aspx



Saidou Koala, AfNet-TSBF, CIAT
AfNet coordinator

The African Network for Soil Biology and Fertility (AfNet) was established in 1988 as a pan-African Network of researchers in Sub-Saharan Africa. AfNet is the single most important implementing agency of Tropical Soil Biology and Fertility Institute of the International Centre for Tropical Agriculture (TSBF-CIAT) in Africa. More recently, a Memorandum of Understanding (MOU) was signed between the Forum for Agricultural Research in Africa (FARA) and The International Centre for Tropical Agriculture (CIAT) for hosting AfNet under the umbrella of FARA. AfNet comprises: a) the AfNet coordination unit b) the AfNet Steering Committee and, c) the members. The AfNet Coordination Unit consists of the coordinator, a research assistant, an administrative assistant, information/database manager and a dissemination and training specialist. The AfNet Steering Committee consists of a multi-disciplinary and gender balanced team of African scientists drawn from the Eastern, Southern, Central and Western Africa regions. Since its inception, AfNet has grown steadily and the current membership stands at over 500 scientists.

The Network aims at strengthening and sustaining stakeholder capacity to generate, share and apply soil fertility management knowledge and skills to contribute to the welfare of farming communities in Africa. AfNet achieves its mission through its main thrusts namely: i) Research and development activities; ii) Capacity building; iii) Information dissemination and management.

Within the context of the CA2Africa project, AfNet is responsible for the development of the database structure (data types and formats) and maintenance/organization of the database.

Upcoming events:

- **5th World Congress of Conservation Agriculture** incorporating 3rd Farming Systems Design Conference, 26-29th September 2011 in Brisbane, Australia www.wcca2011.org

At this congress a CA2Africa paper will be presented: **Impact and adoption of conservation agriculture in Africa: a multi-scale and multi-stakeholder analysis**, by Marc Corbeels et al.

- Second series of **Regional CA2Africa Workshops** - for more info see website: www.CA2Africa.eu or contact corbeels@cirad.fr

Publications

Anyanzwa H., Okalebo J.R., Othieno C.O., Bationo A., Waswa B.S., Kihara J. (2010) Effects of conservation tillage, crop residue and cropping systems on changes in soil organic matter and maize-legume production: a case study in Teso District. *Nutrient Cycling in Agroecosystems* 88:39–47

Corbeels M., Triomphe B., Tittonell P., Affholder F., Lahmar R., Scopel E., Alary V., Jourdain D. (2010). Tailoring conservation agriculture to local contexts and conditions of smallholder farmers in Africa In : Wery J (ed.), Shili-Touzi I. (ed.), Perrin A. (ed.). *Proceedings of Agro 2010 : the XIth ESA Congress*, August 29th - September 3rd, 2010, Montpellier, Agropolis international, p. 37-38. ESA Congress. 11, 2010-08-29/2010-09-03, Montpellier, France. Presentation at <http://vimeo.com/16245435>

Marongwe L.S., Kwazira K., Jenrich M., Thierfelder C., Kassam A., Friedrich T. (2011). An African success: the case of conservation agriculture in Zimbabwe. *International Journal Agricultural Sustainability* 9: xx

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Naudin K., Gozé E., Balarabe O., Giller K.E., Scopel E. (2010) Impact of no tillage and mulching practices on cotton production in North Cameroon: A multi-locational on-farm assessment. *Soil and Tillage Research* 108: 68-76.

Owenya M.Z., Mariki W.L., Kienzie J., Friedrich T., Kassam A. (2011) Conservation Agriculture (CA) in Tanzania: the case of Mwangaza B CA Farmer Field School (FFS), Rhotia Village, Karatu District, Arusha. *International Journal Agricultural Sustainability* 9: xx

Thierfelder C., Wall P.C. (2010) Investigating Conservation Agriculture (CA) Systems in Zambia and Zimbabwe to Mitigate Future Effects of Climate Change. *Journal of Crop Improvement* 24: 113-121.

Thierfelder C., Wall, P.C. (2010) Rotation in conservation agriculture systems of Zambia: Effects on soil quality and water relations. *Experimental Agriculture* 46: 309-325.

CA2Africa partners

Centre de Coopération Internationale en Recherche Agronomique pour le Développement, France ? www.cirad.fr

Centro Internacional de Agricultura Tropical, Colombia www.ciat.cgiar.org

Leibniz-Zentrum Fuer Agrarlandschaftsforschung, Germany www.zalf.de

African Conservation Tillage Network, Kenya www.act-africa.org/

International Centre for Agricultural Research in the Dry Areas, Syria www.icarda.org

Institut d'Etudes et de Recherches Agricoles, Burkina Faso www.inear.bf

Centro Internacional de Mejoramiento de Maiz Y Trigo, Mexico www.cimmyt.org

Institut National de la Recherche Agronomique, Morocco www.inra.org.ma

Consejo Superior De Investigaciones Científicas, Spain www.csic.es

Wageningen Universiteit, the Netherlands www.wur.nl

Website: www.CA2Africa.eu

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