

Points of view: Conservation agriculture

Small scale farming in Africa faces a double challenge: to increase production and preserve natural resources simultaneously. This is not an easy challenge, but one which many people think is key to the development of the African continent, playing a vital role in fighting hunger and poverty. While conventional agriculture, which often involves intensive tillage, has been claimed to cause soil degradation, particularly when practised in areas of marginal productivity, conservation agriculture (CA) refers to a range of integrated soil management practices that aim to minimise the negative effects of intensive farming. Practices such as direct sowing, zero-tillage or minimum tillage, and the establishment of cover crops help to protect organic matter and soil fertility.

To review issues, factors and challenges underlying the widespread adoption of conservation agriculture, the World Congress on Conservation Agriculture organised its third Congress, based on the theme "Linking Production, Livelihoods and Conservation". The aim was to highlight the impacts and linkages of CA to key development and livelihood parameters, including linkages between production, conservation and livelihoods. The Congress took place from the 3rd - 7th October 2005 in Nairobi, Kenya, organised by the African Conservation Tillage network (ACT), the Kenyan Ministry of Agriculture and the Kenya Conservation Tillage Initiative (KCTI) in association with the New Partnership for Africa's Development (NEPAD). The following is a selection of comments highlighting some of the important issues under discussion, drawn largely from papers presented at the Congress.

A more sustainable system?

"In recent years, the concern about sustainable land use has become a worldwide issue, and seeking ways to achieve a synchronic increase in food production and preservation of natural resources requires the world common efforts. In this context, conservation farming or conservation agriculture has become the most promising way to maintain agricultural production sustainably."


'Conservation Agriculture by Small Scale Farmers in the Northern Mountainous Regions of Vietnam'. Paper by Ha Dinh Tuan, Vietnam Agricultural Sciences Institute, Thanh Tri, Hanoi, Vietnam, et al.

"Recent developments in agriculture call for zero or minimum tillage in crop production due to realization of negative impacts of continuous tillage. There is need to develop soil-specific conservation farming practices considering cropping systems used by farmers."

'Effects of tillage practice on cereal and legume yields in a ferralsol of western Kenya'. Paper by Kihara J, Tropical Soil Biology and Fertility (TSBF) institute of CIAT, Nairobi Kenya, et al.

"The agrosystemic approach developed for agriculture in the north has only been possible at a high energy, social, environmental and sanitary cost for both farmers and societies. The sustainability of these systems is strongly called into question today. The countries in the South cannot support these costs and risks."

'A Systemic Approach Based on Direct Sowing, Mulch-Based Cropping Systems for the Promotion of Sustainable Agriculture in Southern Countries'. Paper by L. Seguy and Andre Chabanne, CIRAD, Montpellier, France




"Conservation Agriculture means living with nature, and is the best way to farm."

James Ongwae, Permanent Secretary, Ministry of Agriculture, Kenya



"Conservation Agriculture, by its very tenets and multiple level ecosystem benefits that can be obtained from its adoption, would seem to be a strong and successful, worldwide example of achieving an integrated ecosystem management (IEM) approach to combating land degradation."


'Mitigating Land Degradation and Improving Land and Environmental Condition via Field-Practical Methods of Conservation Agriculture'. Paper by D McGarry, Natural Resource Sciences, Queensland Government, Brisbane, Australia



...maintaining production in a time of change


"Farmers are having to adapt their cropping systems to satisfy multiple criteria, following rapid changes in agronomic context and the demands of society. New cropping systems must be developed and their economic viability and environmental impact evaluated."

'Evaluation of the Agronomic, Economic and Environmental Impacts of No-Tillage Cropping Systems. Results of a Long-Term Experiment in France'. Paper by Michel Bertrand, UMR d'Agronomie INRA INA-PG, Thiverval-Grignon, France, et al.




"The introduction of Conservation Farming usually leads to increased yields, due to the combined effect of several factors, such as earlier planting, more precise input management, and water harvesting."

'Challenges for the adoption of Conservation Agriculture by smallholders in semi-arid Zambia'. Paper by Frédéric Baudron, CIRAD Zimbabwe



"Conservation agricultural and related equipment is identified as one of those areas that presents an opportunity for private sector manufacturers in view of labour and draft power constraints in the smallholder farming sector."


'Experiences and Challenges in Private Sector Efforts in the Development and Supply of CA Equipment to Smallholder Farmers'. Paper by M. Mautsa and Walter N. Chigwada, Zimbabwe



Global uptake

"No-tillage is now being adopted on more than 95 million ha world-wide and the technology is showing increasing interest by farmers. The countries with the biggest area under no-tillage are the USA, followed by Brazil, Argentina, Canada, Australia and Paraguay. These are the 6 countries where adoption is above 1 million ha."

'The extent of Conservation Agriculture adoption worldwide: implications and impact'. Paper by Rolf Derpsch, Asuncion, Paraguay



"With the rapid expansion of wheat zero tillage in the Indo-Gangetic Plains, there has been within that region a surge of interest in resource conserving technologies. In the 2004-2005 wheat season, zero tillage is estimated to have been used on nearly 2m ha of sown area (RWC, 2005)."

'Conservation Agriculture and Resource Conserving Technologies - a Global

Conservation Agriculture and Resource Conserving Technologies - a Global Perspective'. Paper by Larry Harrington and Olaf Erenstein

"Pakistan is rightly proclaimed as an agricultural country. Agriculture is the largest commodity producing sector and mainstay of the country's economy. The Resource Conservation Technologies (RCTs) have shown encouraging results... improving soil biodiversity, reduced air pollution, mitigation of environmental degradation after residue burning, and carbon sequestration."
'Impact of resource conservation technologies for sustainability of irrigated agriculture in Punjab (Pakistan)'. Paper by M. Rafiq Akhtar

But challenges to adoption remain...

"CA undoubtedly has a demonstrated positive impact on crop yield, labour needs, weed control and farm incomes in the study areas...[but] a number of preconditions seem necessary for sustained adoption to take place. These include long term access to land, availability of inputs, especially cover crop seeds and appropriate CA implements, and also adequate extension support and advice together with institutional support."

'Experiences with the Development and Diffusion of Conservation Agriculture in Ashanti and Brong Ahafo Regions of Ghana'. Paper by Philip Boahen, Consultant, Accra, Ghana, et al.

"CF however has a tendency to increase labour requirements for weeding and for land preparation, at least in the first years. Another issue is that many farmers do not manage to prepare their land (either manually or with draft animal power) during the dry season, thus preventing them from reaping part of the potential benefits of CF use."

'Challenges for the adoption of Conservation Agriculture by smallholders in semi-arid Zambia'. Paper by Frédéric Baudron, CIRAD Zimbabwe

"Although smallholders who had tried CA generally asserted that it increased yields, the cost of inputs promoted with CA, the labour involved, the opportunity cost of residues in the dry season, the low esteem associated with smallholder farming and the often different goals and priorities of smallholders compared to those of CA promoters deterred the adoption of CA."

'Constraints limiting smallholder adoption of Conservation Agriculture: some observations based on three South African smallholder-orientated programmes'. Paper by Adrian Bolliger, The Royal Veterinary and Agricultural University, Denmark, et al.

...including the right tools...

"CA will only be sustainable when adapted equipment is locally manufactured. This situation is currently being reviewed by FAO and the appropriate steps, including joint venture private sector initiatives, are being promoted."

'Training in conservation agriculture equipment use: FAO's experience in sub-Saharan Africa'. Paper by Brian G Sims, Engineering for Development, UK and Josef Kienzle, FAO Rome

"Much work still remains to be done with regard to mechanization; in particular, appropriate harvesting equipment, which is not available for medium-sized farms. It is very important that all stakeholders...should endeavor to develop intermediate equipment, which is less expensive and less cumbersome."

'Conservation Agriculture as Applied to Harvesting and Processing Rice (Oryza Satival.) in the South Western, Nigeria'. Paper by E.O. Atanda, Federal

Department of Agriculture, Ondo State, Nigeria

...and approaches

"More empowering, adaptive and participatory, bottom-up research and extension approaches would stimulate more farmers to test and adopt CA. Recognising and respecting indigenous experience and priorities, as well as approaches designed to assist farmers, extension agents and policy makers to understand the system, could ensure a more widespread, holistic and sustained adoption of CA."

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"The inclusion of farmers in the decision-making process, as well as the demonstration and dissemination of the project results, is key to success."

'SOWAP and ProTerra projects - Assessing and disseminating approaches to Conservation Agriculture in Europe'. Paper by Mike Lane, Syngenta, UK

"The presumed agro-ecological advantages of cropping systems with direct sowing of a cash crop in a permanent living cover crop are quite numerous in temperate zones...Maintaining an equilibrium between the cash and the cover crop will be one key of success for these particular methods of cultivation."

'Agronomic Diagnosis of No-Till Cropping Systems with Permanent Living Cover Crop in France: Effects on Winter Wheat (Triticum aestivum L.) Production'. Paper by Matthieu Carof, UMR d'Agronomie INRA/INA P-G, Thiverval-Grignon, France, et al.

"Farmers' minds in Brazil are focused on Integrated Crop x Livestock rotations with Zero Tillage (ICLZT). This win-win-win situation merits the recognition of society, through a policy of both financial and non-financial incentives."

'Integrated Crop/Livestock Ley Farming with Zero Tillage: Five Case Studies of the Win-Win-Win Strategy for Sustainable Farming in the Tropics'. Paper by John N Landers, Associação de Plantio Direto no Cerrado, Brasília, Brazil, et al.