Enhancing adoption of conservation agriculture practices through co-innovation platforms in sub-Saharan Africa

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Introduction

Conservation Agriculture (CA) is increasingly seen as an effective technology to increase farmers' resilience to climatic variability and address soil degradation resulting from agricultural practices that deplete the organic matter and nutrient content of the soil, aiming at higher crop productivity with lower production costs. However, the adoption of conservation agriculture (CA) by smallholder farmers in Africa has been limited so far (Giller *et al.*, 2009). In addition to technical problems and tradeoffs in its implementation, one problem is the promotion of CA as an indivisible package that farmers find hard to adopt in full, lacking involvement of farmers in the design of CA alternatives (Edquist, 1997).

Adoption of Conservation Agriculture practices

Although soil degradation and rehabilitation are physical processes, the underlying causes include social, economic, political and cultural drivers (Blaikie, 1985). Commonly found factors that influence farmers' decision making on land management include (e.g. Feder *et al.*, 1982; Posthumus *et al.*, 2010): bio-physical characteristics of the farm (agro-ecological zone, soil type, farming system), technology (e.g. complexity, effectiveness, profitability), land tenure, farmer characteristics (e.g. attitude, education, personal values), socio-political and economic context (e.g. markets, prices, policies, legislation). However, none of these factors are decisive on their own. Knowler and Bradshaw (2007) show that there are no universally significant factors that affect conservation agriculture adoption, although financial viability and social capital seem to be two key factors.

The adoption of conservation agriculture can be seen as a farmer accepting an innovation; it is not a characteristic of a person or object, but a process that can be divided into a number of 'levels' or phases (Prager, 2002; Lionberger, 1960). The model in Figure 1 illustrates the phases a farmer may go through before ultimately adopting soil conservation measures. Policies, subsidies or regulations can create shortcuts in the adoption process, generally omitting the cognitive phase. As a result, a farmer may adopt soil conservation measures even though he or she may not to be convinced that there is a problem and action is necessary, or that the action prescribed by the policy is the best way to tackle the problem (Prager and Posthumus, 2010). The adoption process of conservation agriculture is assumed to be a similar process as presented in Figure 1, except that soil degradation is not necessarily the motive for conservation agriculture.

Innovation platforms to enhance adoption

The transition from conventional agriculture to CA demands a combination of technological and institutional innovations to address the adoption constraints outlined in Figure 1. Although the transition is depicted as a linear process, in reality loops and iterations may be needed to tailor CA practices to local conditions. The complexity and knowledge-intensive nature of CA requires a strong capacity in problem solving from farmers, service providers and extension agents in order to tailor the technology to local conditions. An innovation systems perspective is therefore needed to tackle the challenges of CA.The active participation of farmers in iterative technology development through action research to facilitate co-learning and co-innovation may be a promising approach to promote CA in sub-Saharan Africa (e.g. Giller *et al.*, 2011; Wall, 2007).

The ABACO project[1] (Tittonell *et al.*, 2011) therefore aims to make use of co-innovation platforms to allow multi-directional knowledge transfer and iteration between the various stakeholders involved in agriculture to develop better targeted, site-specific propositions of what CA means and how it may be put into use. The co-innovation platforms will involve multiple stakeholders such as farmers, extension agents, researchers, supply companies, and policy makers that share knowledge and resources (Figure 2). Taking into account on local context, experiences and as a result of negotiations among involved stakeholders, co-innovation platforms will promote experimentation, adaptation and appropriation of CA technologies and other necessary innovative organizational arrangements, bridging the gaps between research, extension, marketing and farming. The co-innovation platforms will be preferentially located or supported at District level, but with strong linkages to stakeholders and activities taking place at national and local levels. The starting points for the establishment of the co-innovation platforms are in many cases existing Farmer Field Schools and Learning Centres. These entities are already aligned towards learning through doing, but they will need modification and expansion to become effective CA co-innovation platforms.

Most successful innovation platforms are typically built around commodities and a value chain, so that participants can envisage and experience tangible benefits over a finite, defined period. The introduction of CA promises benefits of uncertain magnitude, often over long periods of time. A challenge is therefore to identify and present the value of CA interventions in attractive terms, such that farmers and other stakeholders are motivated to form, maintain and grow the co-innovation platforms. Ecological education raising awareness on how tangible benefits (e.g. productivity, income) are obtained through ecological processes could be one of the drivers of the CA co-innovation platforms. The CA co-innovation platforms will include an exchange and learning component to allow continuous learning, monitoring and knowledge exchange throughout the project.

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[1] ABACO (Agro-ecology Based Aggradation-Conservation Agriculture) is an EU-funded project that is implemented in seven countries in sub-Saharan Africa during 2011-2014 by the following project partners: ACT (Kenya), CIRAD (France), NRI (UK), Wageningen University (The Netherlands), CIRDES (Burkina Faso), FOFIFA (Madagascar), SOFESCA (Zimbabwe), Yellow Window (Belgium) and EMBRAPA (Brazil). This paper has been produced with the financial assistance of the European Union. The contents of this paper are the sole responsibility of the authors and can under no circumstances be regarded as reflecting the position of the European Union.

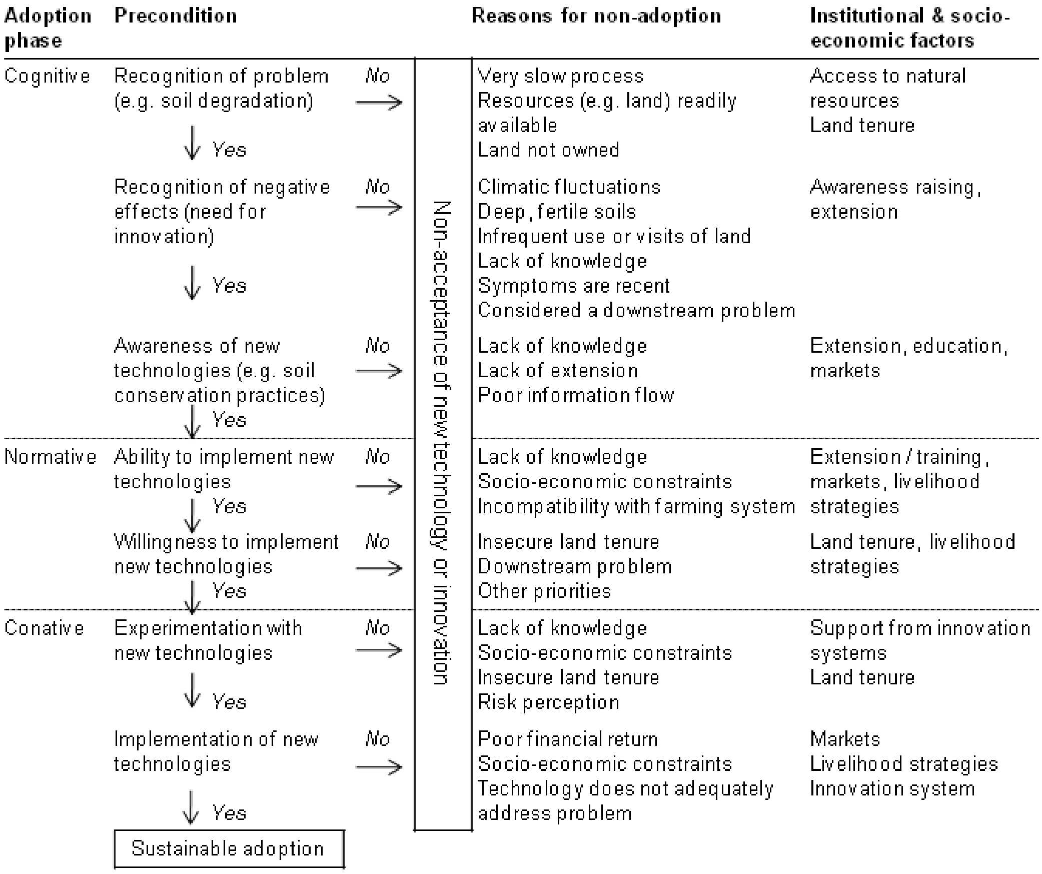

Figure 1. Levels and preconditions of the adoption process of soil conservation. The adoption process is not necessarily linear; there may be loops, short-cuts, or interruptions in the adoption process. Source: Prager and Posthumus, 2010; based on: Graaff, 1996; Lionberger, 1960; Prager, 2002.

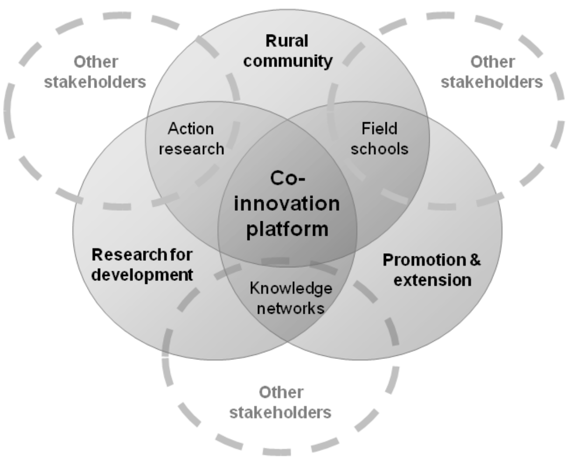

Figure 2. An abstract representation of a co-innovation platform and its possible fields of interaction. The identified 'Other stakeholders' will be different for each situation and include the government, the private sector and/or other organisations involved in the process.

References

Blaikie P. 1985. The Political Economy of Soil Erosion in Developing Countries. Long Development Studies

Edquist C. (Ed.) 1997. Systems of Innovation – Technologies, Institutions and Organizations, London and Washington: Printer Publishers

Feder G, Just RE, Zilberman D. 1982. Adoption of Agricultural Innovation in Developing Countries: A Survey. Washington DC: the World Bank

Giller KE, Corbeels M, Nyamangara J, Triomphe B, Affholder F, Scopel E, Tittonell P. 2011. A research agenda to explore the role of conservation agriculture in African smallholder farming systems. Field Crops Research (in press)

Giller KE, Witter E, Corbeels M, Tittonell P. 2009. Conservation agriculture and smallholder farming in Africa: the heretics' view. Field Crops Research 114: 23-34

Graaff J de. 1996. The Price of Soil Erosion. PhD dissertation. Wageningen Agricultural University

Knowler D, Bradshaw B. 2007. Farmers' adoption of conservation agriculture: a review and synthesis of recent research. Food Policy 32: 25-48

Lionberger HF. 1960. Adoption of New Ideas and Practices. The Iowa State University Press

Posthumus H, Gardebroek C, Ruben R. 2010. From participation to adoption: comparing the effectiveness of soil conservation programs in the Peruvian Andes. Land Economics 86: 645-667

Prager K. 2002. Akzeptanz von Maßnahmen zur Umsetzung einer umweltschonenden Landbewirtschaftung bei Landwirten und Beratern in Brandenburg. Series Kommunikation und Beratung 48; Weikersheim: Margraf.

Prager K, Posthumus H. 2010. Socio-economic factors influencing farmers' adoption of soil conservation practices in Europe. In: Napier TL. Human dimensions of Soil and Water Conservation. Nova Science Publishers. ISBN 978-1-61728-957-6

Tittonell P, Scopel E, van Halsema GE, Andrieu N, Posthumus H, Mapfumo P, Lahmar R, Corbeels M, Apina T, Rakotoarisoa J, Mtambanengwe F, Pound B, Chikowo R, Mkomwa S. 2011. Agroecology-based aggradation-conservation agriculture (ABACO): targeting resource-limited, degraded and climatically variable environments of Africa. 5th World Congress of Conservation Agriculture incorporating 3rd Farming Systems Design Conference, September 2011 Brisbane, Australia

Wall PC. 2007. Tailoring conservation agriculture to the needs of small farmers in developing countries. Journal of Crop Improvement 19: 137-155