Conservation agriculture and smallholder farming in Africa: The heretics’ view

Ken Giller
Plant Production Systems,
Wageningen University, Netherlands
Background

- Conservation agriculture being promoted as a panacea
- Univocal promotion by international organizations, NGOs (and churches!) is stifling debate
  
  e.g. ....“the plough is the enemy of sustainability”


We have two main arguments:
1. Scientific evidence to support the claims made for CA is unclear and inconsistent
2. CA does not ‘fit’ within the majority of smallholder farming systems in Africa

Farming God’s Way

CCK is working to promote a biblical perspective on farming that connects the Christian faith with the most common vocation on the continent.

Based on the proven techniques of conservation agriculture, this is a program originally developed in Zimbabwe that uses scientifically sound, no-till agricultural techniques combined with strong biblical teaching to radically transform farming practices and bring hope to farmers (read more about farming God’s way here).

In many areas, Farming God’s Way has produced dramatic increases in yield. The beauty of this technique is that it protects and improves the productivity of the land at the same time, reducing the need for chemical fertilizer or pesticide application.
Principles of Conservation Agriculture

1. Minimum or no mechanical soil disturbance

2. Permanent organic soil cover - maintenance of crop residues to achieve >30% soil cover

3. Diversified rotations (with legumes)
Is mulch the best way to use crop residues?

CA on steep slopes in Central Kenya
CA and soil erosion on steep slopes in Central Kenya

Guto, de Ridder, Pypers Vanlauwe & Giller (2010) submitted
Does CA lead to increased yields?

Rusinamhodzi, Corbeels, van Wijk, Rufino, Nyamangara and Giller, submitted
Does CA lead to increased soil carbon?

**Graph:**
- SOC content at equilibrium
- Organic C addition
- Saturation limit clayey soil
- No-tillage effect
- Saturation limit sandy soil

Does CA save labour?

- CA without herbicides increases labour demand for weeding
- Shifts labour demand from men to women

Does CA ‘fit’?

We have two main arguments:

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An ‘uniquely’ African green revolution

Kofi Annan called for ‘an uniquely African green revolution in the 21st Century’

Recognising:
• the rich diversity of Africa’s people, soils and farming practices
• the urgent need to increase agricultural productivity

But how do we target technologies to the huge diversity and heterogeneity of African farming systems?
The underlying problem - poor soil fertility
Potential solutions - Nitrogen fixing legumes

- Legume green manures
- Grain legumes
- Legume forages
- Legume tree fallows
Green manures on smallholder farms

...there are no silver bullets....
Resource flow mapping of smallholdings

Farmer Martha
Murewa, Zimbabwe

Manages 6 fields (0.9 ha)
Labour available - 1 full time
1 chicken
Earns manure for homegarden

Farmer Thomas
Murewa, Zimbabwe

Manages 4 fields (3.3 ha)
Labour available - 3 full time
11 cattle, 2 goats, 6 chickens
Uses manure and fertilizers
The ‘niche’ for legumes

The socio-ecological niche

The niche as an ‘n’-dimensional hyperspace
Hutchinson (1957)

The legume ‘niche’ has agroecological and socioeconomic dimensions

Poverty leads to soil degradation - western Kenya
CA in Central Kenya on diverse fields

But how can we rehabilitate degraded soils?

Is enough manure available?
Are there enough crop residues?
Competition for crop residues
Competition for crop residues

Maize harvesting in Murewa, April 2010
Likelihood of adoption by farmers?

- Flat land
- Clayey soils
- Poor productivity
- Many livestock
- Little capacity to invest
- Insecure access to land
- Poor markets
- Poor institutional environment

- Steep slopes
- Sandy/loam soils
- Abundant biomass
- Few livestock
- Wealthier farmers who can afford inputs
- Secure land tenure
- Good markets
- ‘Enabling’ institutional environment
Does CA ‘fit’?

We conclude:

1. Scientific evidence to support the claims made for CA is unclear and inconsistent

2. CA does not ‘fit’ within the majority of smallholder farming systems in Africa

1. A more subtle and differentiated understanding of the farming systems and aims of smallholder farmers is required