TAILORING CONSERVATION AGRICULTURE TO LOCAL CONTEXTS AND CONDITIONS OF SMALLHOLDER FARMERS IN AFRICA

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Background

- 'Push' of Conservation Agriculture in Sub Saharan Africa as a means to overcome continuing poor-profitability, food insecurity and soil degradation on smallholder farms
  - FAO, Worldbank
  - Several donors: SIDA, Norway, USAID, DFID, AFD, ..
  - Several NGOs: CARE international, Worldvision, Foundations for Farming, …
  - Research institutes such as CIMMYT, ICRISAT, ICARDA and CIRAD
  - Governments in southern and eastern Africa have endorsed CA as a pathway to food security
- Often promoted as a "panacea"

« **In Zambia**, conservation agriculture has helped vulnerable households pull through drought and livestock epidemics. **In the 2000-2001 drought**, **farmers who used conservation agriculture managed to harvest one crop, others farming with conventional methods faced total crop failure**.» FAO news release October 4, 2005

Conservation agriculture

- 3 principles underpin CA: (FAO www.fao.org/ag/ca)

1. Minimize soil disturbance by reduced or zero-tillage
2. Keep the soil cov
   harvest residues
   cover
3. Use crop rotation

Many CA systems

Planting lines with Magoye ripper – minimum tillage

Direct seeding – no tillage

Jab-planter – no-tillage

Planting basins – Conservation Farming, Zai

Low adoption rates in SSA

- CA has been widely adopted by farmers in North and South America,- and in parts of Asia
- Much less success with smallholders in Africa despite > 2 decades of research and development investments

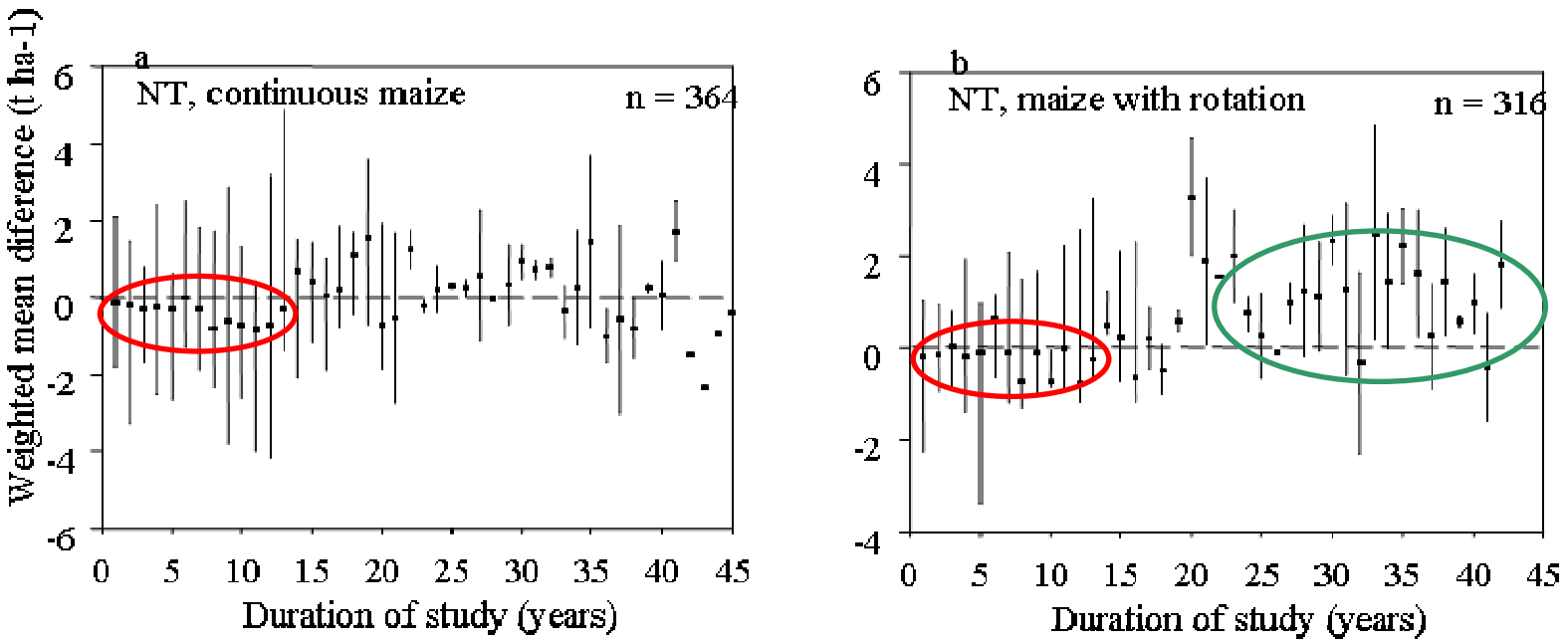
	in 1000 ha	CA % of cropland
Argentina	19719	58.8
Brazil	25502	38.3
Australia	12000	26.9
Canada	13481	25.9
USA	26500	15.3
South Africa	368	2.4
Zambia	40	0.8
Kenya	33	0.6
Zimbabwe	15	0.4
Mozambique	9	0.2
Morocco	4	0.1

Source: Kassam, Friedrich, Shaxson and Pretty (2009)
International Journal of Agricultural Sustainability 7(4) 292-320

Major constraints for adoption/challenges for research and development

1. Yield benefits usually in the long term, while costs are immediate
2. Strong trade-offs with other activities at the farm level and above
3. Poor functioning of and access to (input) markets
4. Knowledge-intensive nature of implementing CA
5. Need for 'tailoring' CA to the huge diversity of farmers, local practices and local / regional environments

1. Yield benefits in the long term: meta-analysis



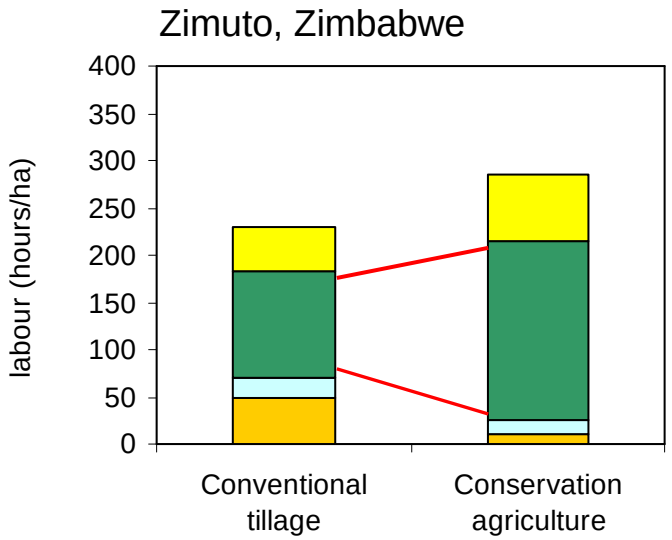
Source: Rusinamhodzi, Corbeels, van Wijk, Rufino, Nyamangara and Giller (2010) Agronomy for Sustainable Development (in review)

- Yield benefits from CA are mostly realized in the long-term, - and when rotations are applied
- Short-term yield reductions: requires further research
- Farmers often attribute higher value to immediate benefits and costs than those realized or occurred in future

2. Strong trade-offs of implementing CA

- Competing uses for crop residues, preventing their availability for mulching;
  - feed is typically in short supply and takes preference
  - especially under semi-arid conditions (where livestock is of great importance and biomass production is low)
  - often non-exclusive products/communal land use: free grazing – local by-laws?
- The reallocation of labour, especially to weeding

2. Strong trade-offs of implementing CA



Source: Siziba (2008) PhD thesis, University of Hohenheim

- CA without herbicides increases labour demand for weeding
- Implying a shift of work
  - from mechanized to manual labour
  - from men to women

3. Poor functioning of markets

- Limited access to inputs: no-till equipment, herbicides, and fertilizer
  - Expensive
  - Lack of effective input supply chain

4. Knowledge-intensive nature of implementing CA

- Implementing CA successfully requires understanding and/or making use of ecological principles
- 'Full' CA systems require major simultaneous changes in soil/crop management
- CA requires significant capacity building (farmers, extension, research)
- As a results- adoption is unlikely to be 'immediate'

5. Need for tailoring CA

- Potential of CA is site- and farmer-specific
- and thus depends on local bio-physical, socio-economic and institutional conditions
- Major challenge for research community: assess *where, which* and *for whom* CA practices may best fit?

5. Need for tailoring CA: framework for 'ideotyping'

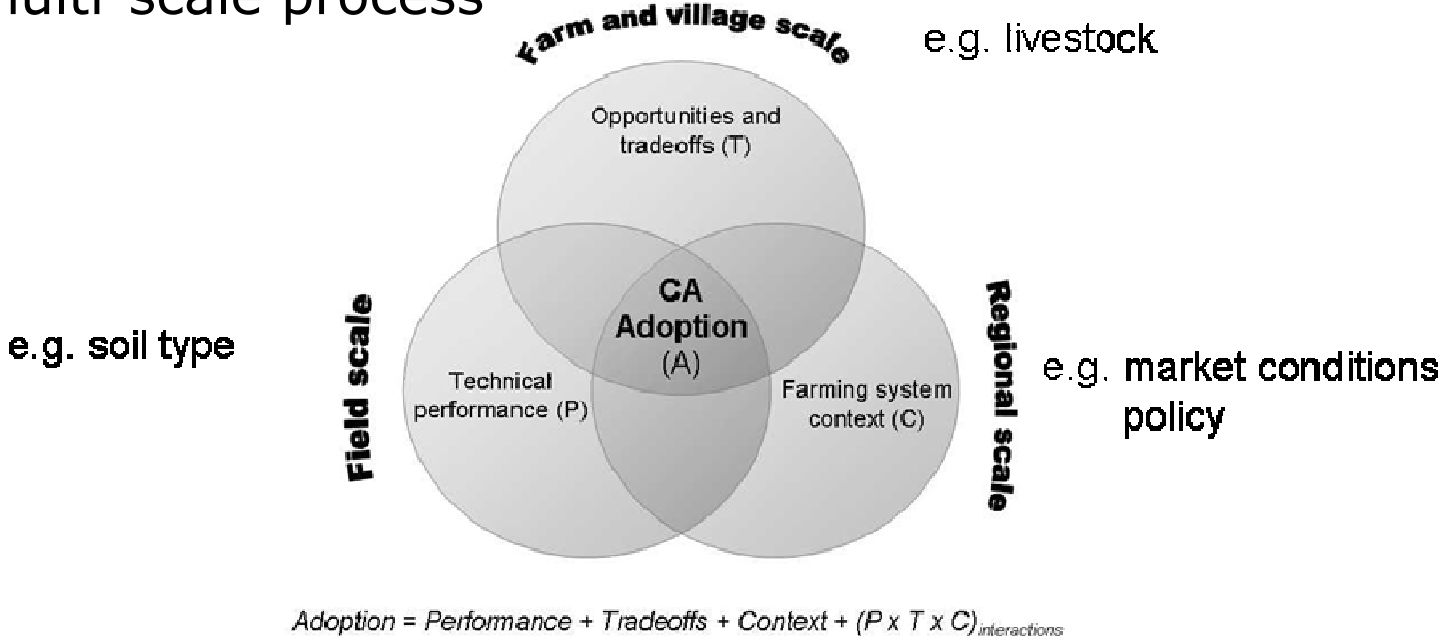
Likelihood of adoption by farmers?

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

- Steep slopes
- Sandy/loam soils
- Abundant biomass
- Few livestock
- Wealthier farmers who can afford inputs
- Stable land tenure arrangements
- Good markets
- 'Enabling' institutional environments

CA, a complex innovation process

- A multi-scale process

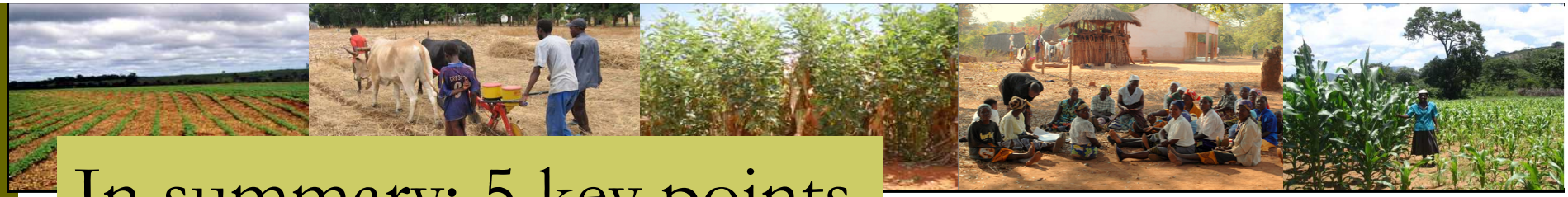


- At each scale opportunities and constraints exist that may favour or impede the adoption of CA
- Technical performance (yield) is clearly but one of the determinants of adoption
- CA is a successful 'innovation' when fully embedded in contexts of the 3 scales

CA, a complex innovation process

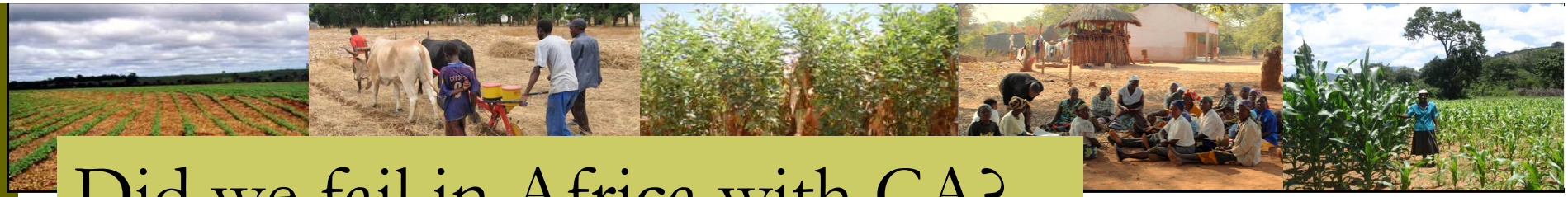
- A multi-stakeholder innovation process

- Non-linear, but interactive approach
- Getting the right stakeholders on-board with their adequate role
- Key role of farmers & their associations



In summary: 5 key points

- Three CA principles but huge diversity of possible CA systems
- CA offers potential yield benefits, especially in the long-term and with « full » CA
- Many R&D challenges in « fitting » CA to local conditions and achieving adoption among smallholders in SSA
- Complex, multi-scale, multi-stakeholder nature of a successful CA innovation process
- Markets, policy and institutional issues are crucial



Did we fail in Africa with CA?

- Lead questions for a fruitful debate:
  - Is the situation for CA development in Africa different from elsewhere?
  - Is it more a question of technologies, or a question of approach to innovation?
  - Does CA addresses a need identified by farmers or by agronomists?