Elements of a sustainable intensification of crop production with Conservation Agriculture"
The combination of
• Continuous zero tillage
• Permanent soil cover and
• Crop rotations
has become known as
Conservation Agriculture
Cuba
development of systems
• Food production has to double by 2030
• Increasing demand for bioenergy and renewable resources
• Growth in crop production below population growth; new bioenergy needs/opportunities
• New land limited (including irrigated land)
• >50% of available water resources already used for irrigation
• Major changes needed to attain the MDGs (higher productivity, less resource degradation)
• Climate change: additional threat
Soil health:

• Soil impacts on production, and on other resources like water
• Cultivated soils have lost considerable carbon
• SOM-levels below 2% are common
• Effects are worse in the tropics
• Tillage is a major soil degrading factor
Degradation of land resources:

- In Asia 90% of potential land is already used
- 1.3 Million ha of agricultural land are lost every year (urbanization)
- Available land per person is declining

![Graph showing agricultural land per capita (ha) over time](FAO statistics, 2001)
Soil organic matter/soil structure:
- storage for soil water (1 % SOM = 150 m³/ha)
- SOM as soil structural element (sand, silt)
- SOM effect on nutrient mobility/availability
- spatial structure more important than pore volume
- spatial structure with soil life (roots, fauna)
- continuous pores for water infiltration and aeration
effect of CA on soil:
• CA adds up to 1 mm soil per year
• organic matter increase at about 0.1-0.2% per year until reaching a saturation
• different rooting systems for more efficient use of soil nutrients
• soil structure more stable
• erosion and degradation stopped/reversed
CA and climate change:

- mitigation through emission reductions (fuel, NO\textsubscript{x}, CH\textsubscript{4})
- mitigation through carbon sequestration up to 0.2 t·ha\textsuperscript{-1}·y\textsuperscript{-1} C
- adaptation through better drought tolerance
- adaptation through better water infiltration (less flooding)
Total area under Conservation Agriculture worldwide 95 Million ha

(Derpsch, 2005)
Maximization of animal performances in best pastures (well fertilized & managed)

14-15 months old steers right to slaughter (young animals market)
Central Brazil: ICLS to renew pastures in degradation and produce biomass for no-tilled systems.

- Renewed pasture after crop phase
- Pasture degradation (high stocking rate x no fertilization)
Biology Transfer
Latin America to Africa?

Tropical Crop-Livestock Systems in Conservation Agriculture: The Brazilian experience
Integrated production systems in West Africa (oncho-freed ecosystems) (RAF)
Mucuna surrounded by Living Fence
Production systems: confined livestock

Early cowpea with residue for feed
Cotton Farmer Field Schools in West Africa
Expanding Partnerships for CA-based Sustainable Intensification

Shared vision
Sharing Experiences
Empowering Natl. Programs
Securing and Sharing Resources
Thank you for your attention!

More information:
http://www.fao.org/ag/ca