Investing in Soil:

Emerging climate-smart business opportunities

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Conservation Agriculture Principles

CA is a farming system on the continuum towards a more sustainable form of agriculture:

Principle 1:

Minimal mechanical soil disturbance with no or reduced tillage.

Reduced tillage is tillage that leaves a minimum of 30% of biomass on the soil surface after planting.

Principle 2:

Maximum diversity in selection of crops, using rotation.

Principle 3:

All year round organic cover on soil, using living plants and/or plant residues

Case study:

Financial Impacts of Implementing Conservation Agriculture

Yield:

- On-farm trials near Reitz in the Free State show that no-tillage leads to more **consistent yields** during drought conditions and **increase in yield in the long run.**

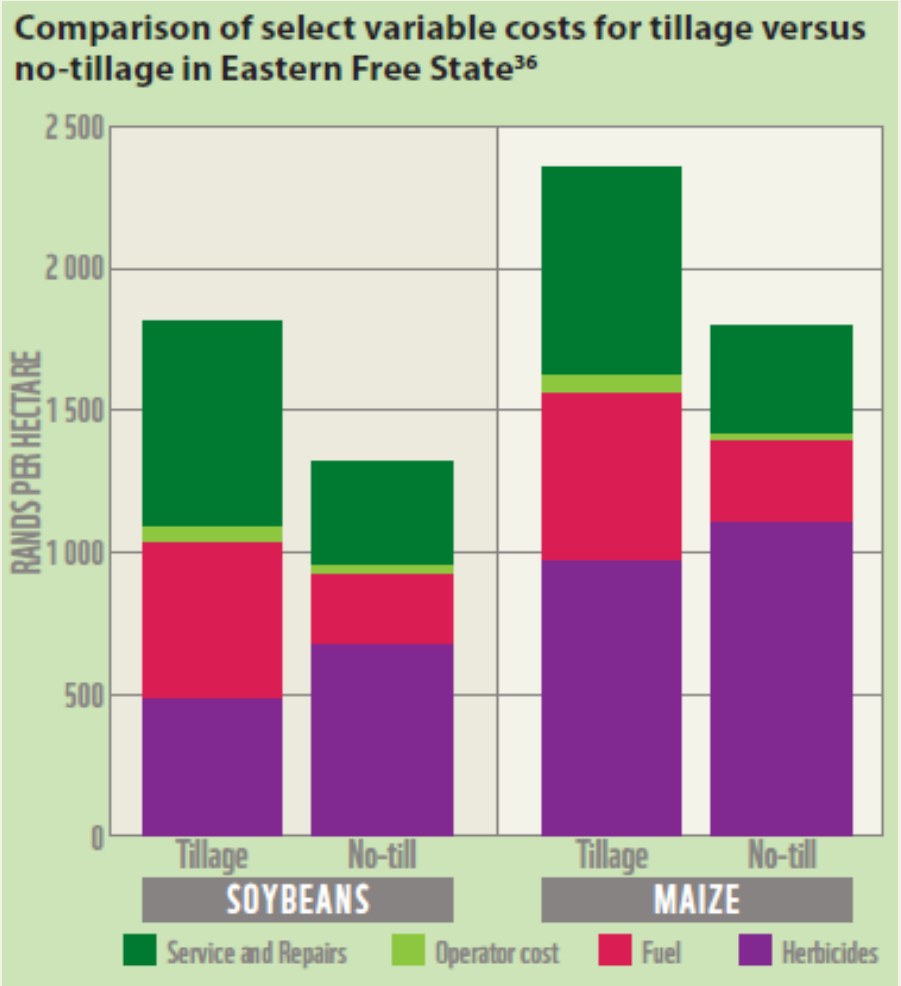
- In other study yields in CA decline initially and only recovered after five years when average crop yields were reported to **increase by as much as 34.21%**.

Case study:

Financial Impacts of Conservation Agriculture

Production cost:

- Average variable cost was 12% lower for CA
- Total variable cost was 10% lower for no-tillage versus conventional tillage



Source: Theunissen (2018)

Case study:

Financial Impacts of Conservation Agriculture

Net Present Value

- Reduced tillage outperforms conventional tillage by a large margin due to lower initial capital outlay than for conventional tillage machinery.
- None of the conventional tillage scenarios show repayment after 10 years.
- Need to collate, monitor and evaluate time series farm level agronomic and financial data for CA in South Africa.

Comparison of Net Present Value (NPV) and Internal Rate of Return (IRR) for conventional and reduced-tillage in Eastern Free State[38]

	CONVENTIONAL TILLAGE			NO-TILLAGE		
	SCENARIO 1	SCENARIO 2	SCENARIO 3	SCENARIO 4	SCENARIO 5	SCENARIO 6
CROP	Maize	Soybeans	Soybeans-Maize Rotation	Maize	Soybeans	Soybeans-Maize Rotation
NPV at 10 years	-924 677	- 1 653 095	-1 294 913	1 873 220	1 068 627	1 464 266
Payback period in years	12	15	13	6	7	6
Real IRR at 10 years	1.3%	-3.8%	-1.2%	28.5%	19.2%	23.4%
Real IRR at 20 years	13.8%	10.5%	12.1%	33.7%	26.5%	29.6%

Source: Theunissen (2018)

Case study:

Greenhouse Gas Mitigation Potential of Conservation Agriculture

- Wheat sector selected due to available comparative average diesel consumption figures are available for conventional agriculture versus CA for wheat across the country to calculate GHG

- Conservative assumption of 20% CA adoption in wheat in SA

- Estimated GHG emissions of 251 033 t for CA compared to 331 075 t for conventional agriculture

- Resulted in a saving of 9 800 tCO2e tonnes per annum.

Barriers to Conservation Agriculture

	Barriers
Lack of knowledge	• CA is knowledge-intensive and complex to learn and implement. • Little comparative databased analysis has been published to empirically establish the benefits of CA.
Policies and regulatory environment	• Lack of enabling policy environment
Cost	• High cost of specialized equipment. • Potential risk of decline in yields at early stages of CA conversion. • Delay between investment and financial performance.
Site specificity	• Farming enterprises differ with regards to soil type, climate and other resources affecting performance.

Case Study Recommendations

Institution	Recommendations
Government Departments and Policy-makers	Provide an enabling environment and policy for adoption of CA.
Government, NGOs and private sector	Promote public-private partnership to increase investment opportunities
Government and NGOs	Develop more farmer-led research initiatives to demonstrate CA application.
Unions	Collaborate with industry and government to advocate for improved smallholder farmers' access to technical advisory services, finance and support services

Thank you

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