Controlled Traffic Farming system: analysis and pilot project in the Zimbabwean sugarcane industry

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Neil Lecler is a Principal Agricultural Engineer at the Zimbabwe Sugar Association Experiment Station and an Honorary Associate Professor at the University of KwaZulu-Natal. His PhD was on the development and application of tools and methods to assess the performance of irrigation and water management systems. He was born and grew up in Rhodesia and then Zimbabwe but has worked mainly in South Africa; at Agricor in the former Bophuthatswana, at the University of Natal (now University of KwaZulu-Natal) and at the South African Sugarcane Research Institute. Most of his professional life and research effort have been aimed at developing and integrating tools, management systems and institutional arrangements to support more effective water use at both field and catchment scales. He moved back to Zimbabwe in June 2010. It was a high risk move but there were opportunities to initiate projects to turn research into practice and possibly revolutionize the way sugarcane is farmed and irrigated in southern Africa. Neil has registered a patent, supervised or co-supervised nine successful M students and authored or co-authored more than fifty publications. He is a keen golfer and also enjoys the odd game of cricket, tennis and squash and a little bass and fly fishing.

ABSTRACT: A pilot project to introduce a new controlled traffic farming system (CTF) to the Zimbabwean Sugarcane Industry has been initiated. The CTF system is founded on:

- controlled traffic/permanent in-field traffic lanes to minimise compaction and stool damage;
- reduced re-establishment costs, facilitated by the controlled traffic lanes and the development of zero-till cane and crop planters. By limiting compaction to defined and permanent wheel-tracks and using zero-till planters, expensive tillage operations to alleviate compaction and prepare a seedbed are not necessary after initial establishment;
- more frequent break crops and re-planting;
- a harvest and planting schedule designed to allow the crop to be cut at an optimum age when the sucrose content is relatively high, yet ensure constant delivery of cane to the mill.

Theoretical analysis of the CTF system shows the following benefits can be expected:

- more productive soils and reduced pest and disease pressures due to more frequent break crops such as sunn hemp;
- reduced energy inputs due to reduced tillage operations and higher field operating efficiencies due to auto-steer and permanent traffic lanes;

- reduced transport and milling costs because the cane will have a relatively higher sucrose content at harvest;
- reduced capital and maintenance requirements because heavy tillage implements are no longer required;
- improved performance of new varieties which are better suited to fewer ratoons;
- substantially increased sugarcane and sucrose yields;
- substantially higher water use productivity (yield per amount of water used over a whole cropping cycle);
- substantially increased profits;
- better environmental impacts.

In this paper a report is made on the analysis of the improved farming system and the challenges encountered in implementing the system as a pilot project on 500 hectares with a large scale collaborator.