

CTF Impacts: Environmental = Economic impact

Jeff Tullberg

CTF Solutions



Jeff Tullberg is an agricultural engineer who has worked on the energy, equipment and soil/crop impact of CTF at UQ Gatton from the early 1980's. He has research, teaching, extension and/or consulting experience in Australia, UK, USA and China. He is a Director of CTF Solutions, Adjunct A/Prof at the Universities of Queensland and Southern Queensland, and an active contributor to ACTFA.

ABSTRACT: Energy: CTF reduced power requirements by 30% in harvesting¹ and 50% in soil engaging (seeding)¹⁸, operations respectively. *It is also the reason for a 10 – 40% reduction in fuel costs per crop².*

Soil Structure: in the absence of wheels and tillage, visible, measurable improvement in soil structure and porosity spread slowly down the soil profile⁸. This was why CTF soil had ~50% better maximum infiltration rate⁵ and plant available water storage capacity⁸. *It is also the major driver of yield improvements of between 7%²² and 15%⁶.*

Less Runoff⁶ resulted in reduced erosion²³, soil, nutrient and herbicide loss and waterway pollution⁷. *Erosion reduces long-term productivity, and pollution represents an immediate waste of expensive inputs¹⁴.*

No-Till Compatibility: standing residue lasts longer in CTF, which also eliminates tillage repair of harvest traffic ruts. The precision guidance facilitates inter-row planting and shield spraying. These are all associated with greater residue levels, reduced soil evaporation *improved yields and reduced costs¹³.*

Soil Health: earthworm numbers in long-term CTF soil were ~ 100% greater than wheeled no-till^{10,11}, with beneficial effects on most soil biota. *Valuable outcomes include suppression of soilborne diseases¹⁵.*

Timeliness: hard, compacted traffic lanes allow field operations to start sooner after rain. The average reduction in delay was 8 days (sub-tropical cropping⁹) and 2-3 days (dryland³), improving the efficiency and flexibility of all planting, spraying, fertilising and harvesting operations, *and facilitating productive use of the increased soil water¹³.*

Crop Yield: replicated trials report mean yield gains of 7%,²² 12%³ and 15%⁶, but these trials cannot capture the impact of CTF system synergies, such as improved timeliness, which allow system intensification and greater conversion of rainfall into biomass and grain. *Synergies are the major contributor to increased productivity and profitability²⁴.*

Soil Emissions: trials in dryland grain²¹ confirmed overseas results^{12,17,21} showing that the improved soil structure in CTF produced roughly half the nitrous oxide emissions and

absorbed (rather than emitted) methane. Denitrification usually occurs under similar conditions, ***another reason why CTF should improve nitrogen efficiency***¹³.

Soil Carbon: greater yield, biomass production and residue retention, combined with minimum soil disturbance might be expected to have a positive effect on soil organic matter, soil carbon balance, ***and long-term productivity***.

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* CTF is an intensively cropped min-till farming system with all heavy wheels restricted to permanent traffic lanes in a layout designed for efficient drainage. Many farmers claim to use CTF, but <10% comply fully with this definition.

