

## THEME 2. MAKING CTF BETTER

### Using RTK GPS and GIS software to manage deep and rutted wheeltracks in CTF and raised bed systems

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*Tim has been researching and assisting farmers to adopt CTF since 1995, and was involved in some of the fundamental research in CTF in the mid to late 1990's. For the past 12y Tim has been an agricultural consultant specialising in CTF and Precision Ag, particularly in the area of GPS autosteer, machinery modifications, farm layout for drainage and erosion control, yield mapping, and remote sensing. Tim is based here in Toowoomba, but has around 400 clients across Australia, New Zealand, Africa, and North America.*

**ABSTRACT:** Deep and rutted wheeltracks often occur in CTF (Controlled Traffic Farming) systems, as a result of the vertical soil compaction under the track, as well as the improvement of soil where there is no compaction. In some cases however, wheel tracks can get progressively worse to a point where they are unmanageable, and can be the cause of erosion and ponding. This has been particularly the case in the past two years in Australia, where many areas have seen above average rainfall.

This paper examines how new technology can help to prevent and manage wheeltracks, and correctly position run direction, in CTF and raised bed systems. Case studies from Central Queensland, Southern Queensland, New Zealand, and Africa are used to demonstrate its use.

Using RTK (Real-time Kinematic) GPS collected from the farmers' tractor and a new GIS (Geographic Information Systems) software program, we can now ascertain in any part of a field where:

1. Ponding or erosion is likely to occur in the landscape, prior to any rainfall occurring;
2. The impact of wheeltrack depth or bed design on ponding depth and runoff; and
3. The impact of farming direction on ponding and runoff, at a given wheeltrack depth.

Results from real world case studies have shown:

- Changing farming direction resulted in approximately a 2/3 reduction in ponding volume given 20cm deep wheeltracks on a Southern Queensland farm. Reducing
- the width of raised beds in New Zealand from 1.8m to 1.5m, but maintaining the track width, led to a reduction in maximum runoff velocities from a simulated storm by almost 20%
- A central Queensland farm was able to reduce ponded area by 50% simply by changing run direction
- Adding 20cm deep wheeltracks on a paddock in Sudan resulted in the ponded area increasing from 44% to 88% of the field.

This paper will also examine methods to remediate deep wheeltracks, as well as methods to prevent them from deepening in the first instance.