Zero-till potato planting on ferrosols? Does this offer something for the future? The second season of a commercial controlled traffic farming (CTF) demonstration paddock in Tasmania, Australia, started with the planting of potatoes. The demonstration includes some small areas that were zero-till planted. The paddock has now been managed under a CTF system since August 2007.

Onions were grown in the first season of CTF and were harvested with a single bed, in-line, direct loading harvester, which avoided the need to drive wheels over the crop bed. Some minor remedial tillage was required to deal with some soil compaction that occurred as a result of tracking issues with the harvester and chaser trailer.

The area was sown to a rye grass cover crop after onion harvest. The cover crop could have been sown the day after onion harvest was completed on the CTF area, but the adjacent conventionally harvested area had to wait for rainfall and then deep ripping before it could be sown - a difference of about 5 weeks in timing.

The cover crop was sprayed off in September and potatoes planted in late October and early November. Most of the crop beds in the CTF area were deep loosened, to give extra depth of tilth for potato planting, while retaining the compacted wheel tracks. Some beds were left uncultivated, and these were planted zero-till (photo alongside).

Zero-till potatoes might seem a strange idea, given the planting operation itself results in complete disturbance of the soil. However, just being able to put potatoes in the ground without any prior tillage is a big step forward on clay soils. Equally, the ease with which following crops could be planted into these soils was immense. On the CTF beds, soil loosened by the onion lifting share remained undamaged and could immediately accept another crop. This was only possible because of the soil condition left by the CTF operations.

Ferrosols are generally strongly acidic throughout, lack strong texture contrast and are high in free iron oxide, giving them their distinctive red colour. They display a gradual increase in texture (clay content) with depth. Surface soils are often clay loams that grade into light clays in the subsoil. Although these soils are considered to be well structured and attractive for agriculture, they can degrade under intensive cropping from erosion and compaction.
The CTF demonstration on this commercial farm is based on a 1.6 m track width (potatoes at 80 cm row centres). This caused some problems at harvest with the two-row harvester, partly related to the digging web frame riding on the compacted traffic lanes and not allowing full working depth to be achieved. Despite resorting to a conventional single row machine and therefore random traffic, the residual soil structure effects of 18 months of CTF became plainly visible during heavy rain. The pictures really tell the story. These photos were taken after 45 mm of rain 10 days earlier and while it was still raining on a day when another 45 mm had already fallen. Not only was valuable water lost from the profile of the conventional area, but run-off was sufficient to take some of the finer soil particles with it and in many cases this would have included chemicals and fertilizers.

There is still a way to go before we can be confident that the mix of CTF, zero-till and potatoes is going to work, but the most recent planting has given support to the value of CTF in terms of soil condition.

A second demonstration site has been established on the Tasmanian Institute of Agricultural Research farm. This was planted to potatoes in November 2008 and harvested in March 2009. The conventional area was harvested with a standard single row harvester, and the CTF area with a twin row harvester modified to suit CTF on 2 m track width. After harvest, there was very little soil that had not been run over and severely compacted in the conventionally managed area. Compaction was so severe that pushing a fork into the ground required several minutes of levering and full body weight on the fork. On the CTF beds, the fork could be inserted with little or no pressure and the friable soil eased out in one movement. The effects of rainfall on this site can be seen in the accompanying photos.

Although there remain engineering challenges, the benefits of CTF in this production scenario are so great that investment in research and development are essential. Only in this way will this practice become available to most farmers wishing to increase productivity while reducing their costs and carbon footprint.