

# Overview of CTF research activity in Central Europe and Australia

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## Background

Controlled traffic farming (CTF) has fundamental advantages in improving soil structure, which enhances crop and environmental performance with reduced inputs of energy and time compared with conventional field traffic systems. CTF is regarded as a practical and cost-effective technology to mitigate some of the unwanted effects of traffic-induced soil compaction. Intensification of agriculture and increased output will necessitate rapid adoption of sustainable technologies and their careful integration with those already in place. Therefore, increased adoption of CTF coupled with conservation tillage and with the aid of precision agriculture technology, can significantly increase both productivity and sustainability of arable farming. The increase in crop yield that is possible with CTF is due to a combination of overall improvement in soil conditions, and enhanced fertiliser use efficiency and nutrient uptake under those conditions. Greater nitrogen (N) uptake from applied fertiliser N reduces the risk of wastage through N<sub>2</sub>O emission. Research conducted by the authors has shown N recoveries which are 10% to 15% higher where traffic compaction was absent. This is an important consideration since much of the effort on reducing greenhouse gas (GHG) emissions has been centred on reducing N application rates, which can compromise meeting future demand for food crops, restrict CO<sub>2</sub> capture by crops and affect regeneration and maintenance of soil organic matter.

## Aim

The aim of this paper is to report on some of the research activities into controlled traffic farming being conducted in Central Europe and Australia. This work seeks to demonstrate that: (1) soil degradation processes can be reversed under a controlled traffic/zero tillage soil management system due to the synergistic effect between the two, and (2) significant gains in productivity with lower environmental impact can be achieved based on the integration of CTF and zero-tillage. It is envisaged that the outcomes of this research will encourage land managers to shift from a more common production-driven approach to farming to one that can deliver long-term economic and environmental benefits.

## Ongoing research

Research projects in Central Europe are led by the Slovak University of Agriculture in Nitra and include: (1) Agronomic performance of strategic crops established in soils subjected to controlled and random traffic regimes, and (2) Soil conditions improvement through controlled traffic farming. In Australia, the projects are led by the National Centre for Engineering in Agriculture in partnership with the Australian Controlled Traffic Farming Association Inc., and include: (1) Greenhouse gas emissions reduction through CTF, and (2) Two PhD-based projects investigating timeliness, energy requirements and soil compaction in CTF and non-CTF systems, and improved fertiliser management in arable crops under CTF, respectively.

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