

Precision Agriculture – the Landcare Opportunity?

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The label 'precision agriculture' (PA) was first in the 1980s to describe the process of using GPS positioning and yield monitoring to produce yield maps as a basis for better crop management. The technology has been improved and refined over the years and is now used on a regular basis by some farmers, providing better matching of fertiliser inputs to crop performance within defined management zones.

Since that time the accuracy of affordable GPS systems has improved from 5 m to 2 cm (nominal values), so the opportunities to improve the economic and environmental performance of farming are also correspondingly greater. The first opportunity is controlled traffic farming (CTF), improving crop performance by optimal management of non-wheeled beds, and machinery performance by keeping all heavy wheels on hard permanent traffic lanes.

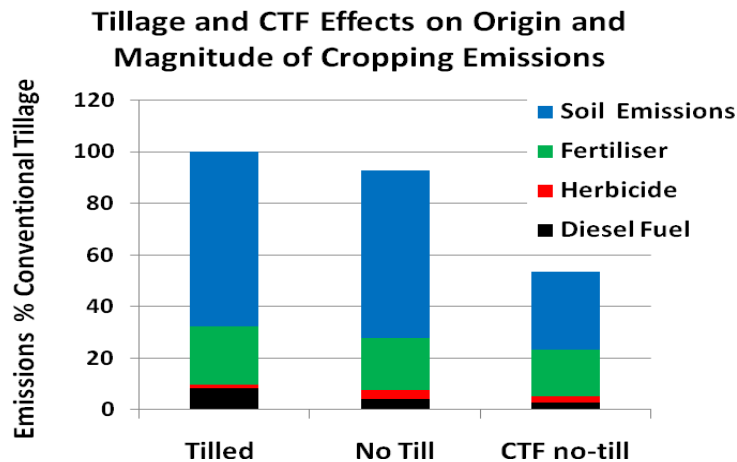
CTF is the original 'no-brainer': the most basic CTF system will produce a dramatic reduction in fuel consumption, simultaneously increasing rainfall infiltration rates, soil health and crop performance. GPS also allows precise contour mapping, the basis for better paddock layout and water management. High-quality CTF systems are the basis for increased cropping frequency and residue protection in permanent no-till broadacre cropping. It is also the basis for greatly reduced tillage in intensive horticulture.

As precise guidance becomes cheaper and more reliable, more farmers are looking at the opportunities available from a precise relationship between machine and crop, or crop residue. The obvious application -- careful positioning of the next crop in relation to residue of the previous crop -- is already widely used, reducing seeding problems and disease carryover where cereal is planted on cereal. It can facilitate rotation when a strong residue is used to encourage and support taller growth in low growth-habit, difficult- to-harvest legumes

Precision principles are also the basis of band application of pesticides, 'shield spraying' and 'weed seeker' technology; different aspects of precision that will be increasingly important in

dealing with herbicide-tolerant weeds. As fertiliser gets more expensive, split application, often rapidly and precisely placed as liquids, will also reduce costs and off-site impact.

It's interesting to note that every one of these 'precision' technologies has an environmental payoff, as well as underwriting greater crop yields at reduced cost. One example is the triple-bottom-line benefits of using CTF for timely application of fertiliser to non-compacted soil -- which has greater biological activity and is less easily waterlogged. The outcome: less fertiliser applied, less pollutants in the waterways and (from preliminary indications) a dramatic reduction in greenhouse gas production.



For the urban community, the label Landcare has often been associated with organic and permaculture-type cropping. These systems might indeed have significant ecological benefits and be suitable for wealthy niche markets and alternative lifestyles. Unfortunately, they are usually impractical on a large-scale, and quite incapable of feeding the large urban communities which are home to a rapidly-growing world population.

“Precision’ technologies, based on modular, accurately guided CTF systems provide a great opportunity for more ecologically-based production. Obvious examples are the use intercropping or relay cropping, where two different crops (on different timescales) grow simultaneously in alternate rows. It is not difficult to see this approach extended to systems such as ‘alley cropping’ which might allow the incorporation of perennials in spatially defined zones.

A small number of innovative farmers are already taking tentative steps towards these new applications of ‘PA’, but the whole topic is too adventurous, time consuming and failure-prone for mainstream rural research and development organisations. The applied aspects are expensive, and don’t fit the three-year University research funding cycle. Is it just possible that a community-based organisation like Landcare could be the prime mover for such projects?