Adopting Controlled Traffic on an Average-sized Property in an Economically Rational Way

Wes Baker[1] and Paul Blackwell[2], [1]Corrigin WA, [2]Department of Agriculture and Food WA, Geraldton

BACKGROUND

My property is situated mid-way between Brookton and Corrigin about 200km east of Perth in the Central Wheatbelt. When the seasons used to be normal the annual average rainfall was 330mm and the growing season rainfall (May to October) was 240mm. All the soils on my property are duplex with A-horizons ranging from gravely sand through to grey clay. The major soil type is however, is loam over clay. The property has a total area of 2,280ha, of which 2,135ha are arable. This includes a recent purchase of 1130ha of neighbouring land which happened to become available in an otherwise stable ownership environment. Cropping occupies 84%, or 1,793ha of the arable area, and sheep graze the remainder 342ha. The topography is gently undulating over 90% of the arable land. The remaining 10% is best described as flat. Our cropping program includes wheat, lupins, barley, canola and field peas.

HISTORY OF MY CONTROLLED TRAFFIC AND PRECISION AGRICULTURE ADOPTION

My first acquaintance with the technology that is now becoming the norm, rather than rare was in 1996. In that year I obtained my first yield mapping capability and this began to open my eyes as to the productivity variability across my cropping program. Around the same time I heard of the work that Dr Paul Blackwell of DAFWA was doing with controlled traffic and the possibility of improving the efficiency of my operations, both in terms of movement around paddocks and in terms of minimising inefficiencies in the operations of seeding, spraying, mid-season fertiliser applications and harvest appealed to me, and I purchased some marker arms in 2001. These provided my first experience with controlled traffic.

I persevered with the marker arms for four seasons and upgraded to auto-steer for the 2006 season. Like other data (see Blackwell in these proceedings) reductions in the order of 20 per cent have been achieved in the amount of fuel used.

Now my interests lie in increasing the productivity of the less productive areas of my cropping area. Each year I compare yield maps, and I have now identified those areas that are always less productive. These are currently being analysed for nutritional deficiencies, and some ameliorative applications of potassium have been spread in a relatively rudimentary form of zone management.
Some form of profitable zone management is now my immediate challenge.

MY SYSTEM

Currently my machinery is based on a 3m trackwidth. However, the tyre widths are not matched, and my tractor still has dual rear wheels. As my machinery replacement program and budget allow, I plan to progressively achieve a 100% match in trackwidth and tyre width. The ultimate decision on any of my replacement upgrades is confidence that the improved level of performance will be profitable in its own right.

My machinery and operations compacted 41% of the land before I started. The proportion currently compacted by tracks is 26%. Ultimately, I will decrease the area compacted by my machinery tracks to 13%. During harvest the chaser bin travels down an adjacent track and pulls across parallel with the harvester until it fills. It then moves back onto the adjacent track and moves off the paddock.

CHALLENGES OVERCOME AND REMAINING

Overcome

The significant challenge I have had to deal with so far is not the layout or operational pattern of controlled traffic working, but the need, time and expense of making sure my runs were not obstructed by:

- clearing odd trees that align with the central portion of my machine runs;
- clearing rocks;
- removing grade banks and drains; and
- installing roaded catchments to fill dams, to replace of the grade banks.

Trees that align with the edge of my runs are retained because the overlap involved in avoiding them is minimal.

These challenges are common for any farmer starting to adopt controlled traffic, and warnings of their likely occurrence and advice on options to handle them is now easily have been provided by Departmental experts and farmers who have adopted Controlled Traffic. The orientation of the controlled traffic tracks are determined by the shape of the paddock. The tracks are aligned with the longest fence in each paddock. I have not experienced any problem with rain running from my tracks and causing erosion or waterlogging in depressions. I put this behaviour down to improved soil conditions creating less runoff, and tracks that run obliquely across the slope so that any run off from them infiltrates into the seedbed on the downhill side of the track. I am quite confident that this option will work because measurements (Blackwell *unpubl.*) on my property have shown the soil between tracks has up to 300 times the infiltration capacity of the tracks. My stubble management practice prevents avoids seeding problems with successive crops. The stubble is cut short and the chaff is caught in a trailing chaff bin, which is dumped in the paddock when full. The chaff is either sold as stock feed or burned in the paddock. Weed and disease management is routine.

Remaining

I have an occasional difficulty with the reliability of my GPS signal, which is probably a sensor problem that can be overcome by an upgrade. The base station has to be moved sometimes, which requires a recalibration with each move to re-establish exact positioning on the existing tracks. This is a challenge that other farmers share with me and again is an issue that Paul and others have recorded.
I aim to adopt as much precision in the management of zones of differing productivity. So far I have identified and classified ‘high’ ‘moderate’ and ‘low’ productivity areas and have undertaken site specific analyses of the soil in these areas. So far, the only identifiable treatment has been zonal applications of potassium fertiliser as this has been the only nutrient shown to be deficient. I am keen to find other treatments that will raise the productivity of the ‘moderate’ and ‘low’ productivity areas and will invest appropriately when I am confident I have a profitable solution.

CONCLUSIONS

Although I do not have explicit financial records of the costs and benefits of auto-steer, my bottom line indicates that the cost was recovered in one year!! How you may ask? Well, as many will have

heard from a number of sources, particularly from Paul Blackwell and Bindi Isbister of DAFWA, I have achieved this through a combination of the following factors:

- Increased ease of operation (on the operators and machines) for all activities, spraying, seeding, applying mid-season fertiliser dressings and harvesting;
- Increased efficiency of seed, fertiliser and spray applications;
- Improvements in soil conditions over and above those attributable just to the adoption of no-tillage practices;
- Noticeable reductions in the draft and fuel usage, through better traction on the tracks and the reduced draft requirements for the soil between our tracks, which has markedly improved in condition.

My experience leads to the overall conclusion and recommendation for those thinking of adopting controlled traffic and precision agriculture, and this is that the most economic way of adopting this new way of farming is to first buy a guidance system and a yield monitor. These do not have to be the latest and most precise. Taking this economic and somewhat conservative route allows one to learn and adapt their operations incrementally with little or no financial risk.

REFERENCES

Blackwell, P. (2007). Development of Controlled Traffic in WA and Future Directions Integrated with Precision Agriculture these proceedings).