Minimal tillage

Minimise tillage using controlled traffic (at >1.8m) giving uncompacted permanent beds. Best used with GPS technology. Full crop cycle green cane trash blanket (trash retention is not common in furrow irrigated areas in the Burdekin region).

Water quality

A number of studies in sugarcane have shown that controlled traffic farming systems including trash retention reduce the levels of sediment, pesticides and nutrient in runoff. This leads to improved water quality outcomes.

Green cane trash blanketing is an effective method for retaining groundcover in the sugarcane system. It reduces erosion potential and suppresses weeds. However, in some circumstances, retaining a trash blanket may interfere with the efficiencies of water movement throughout paddocks and harvesting. This is particularly important for high yielding and/or flood irrigation districts such as in the Lower Burdekin, where green cane trash blanketing has not been widely adopted due to these potential limitations (29S & 42S & 12S).

Costs and benefits

Controlled traffic with GPS, incorporating permanent beds in conjunction with green trash blanketing can provide:

- reduced soil compaction with enhanced water penetration and a reduction in irrigation applications
- improved profitability through reduced tillage with a majority of case studies showing a halving of tractor hours and a significant reduction in labour costs
- enhanced soil health with an improvement in productivity over time
- efficiency improvements in mechanical operations such as spraying and strategic zonal tillage

The accuracy of GPS system further maximises these efficiencies.

Field experiments undertaken in Mackay and Ingham have shown that strategic tillage operations may still be required at the end of the crop cycle. This alleviates soil compaction and maximises the opportunity for crop growth in the subsequent plant cane (8S).

Case study in the Wet Tropics

On a 210ha farm near Ingham, an improved system of dual row controlled traffic with GPS and legume crop rotation demonstrated the following benefits:

Reduced land preparation costs by approximately 71%,

reduced weed control costs by up to 33%,

lower total cost of production (20S).
Case study in the Burdekin
On a 60ha cane farm near Ayr an improved system of reduced tillage operations and a rotational soybean crop that was harvested for seed production demonstrated the following benefits:

- Improved farm profitability and sugarcane productivity
- Diversification of farm revenue
- No requirement to change farm machinery and equipment (zero capital costs)
- Reduced chemical and fertiliser inputs
- Labour savings (less time required to cover the same amount of area and faster operations because of the controlled traffic system) (43S)

Field experiments in the Mackay-Whitsundays and Wet Tropics
In field experiments in Mackay and Ingham a comparison between permanent non-tilled beds and re-formed beds showed that strategic tillage at the end of a crop cycle may be required to alleviate soil compaction, accrued over the crop cycle. This was necessary to avoid carry-over soil compaction, affecting the yield potential of subsequent cane crops. However, having all machinery under GPS may negate the need for end of crop cycle tillage operations to alleviate compaction. A reduced tillage strategy which maintains yield is expected to increase overall profitability through operational savings such as labour, fuel and machinery maintenance (8S).

Case study in the Burnett-Mary
An economic assessment of a Childers farm showed an improvement in profitability through the introduction of a controlled traffic farming system. This included GPS guidance on all equipment entering paddocks. The overall gross margin increased by approximately 12%, with variable costs reduced by 58%. This economic analysis assisted the farmer in making informed business decisions before committing capital investment (9S).

Sugarcane extension services
Smartcane BMP
This program assists growers to ensure their practices on farm are at industry standard. It was released in December 2013. It was developed by CANEGROWERS and funded by the Queensland Government.

Fertcare
This program is a joint initiative of the Australian Fertiliser Services Association and the Fertiliser Industry Federation of Australia. It provides training, quality assurance, certification and accreditation. The training program delivers training in managing food safety, environment and occupational health and safety risks associated with the storage, handling and use of fertilizer and soil ameliorant products.
Website: www.fifa.asn.au
Phone: 02 6230 6987 (Canberra)
Email: fertilizer@fifa.asn.au

Project catalyst
Project Catalyst is a partnership between Reef Catchments NRM, the Coca-Cola Foundation, WWF and Mackay Whitsunday sugarcane farmers. The project has also expanded into, both, the Wet Tropics and Dry Tropics NRM regions. It aims to improve water quality and reduce the impact of pollution in the Great Barrier Reef, using innovative land practices.
Website: http://reefcatchments.com.au/land/project-catalyst/
Phone: 4043 8000 (Terrain Innisfail)
Email: info@terrain.org.au and/or belinda.billing@reefcatchments.com

Sugarcane economic tools
Farm Economic Analysis Tool for sugarcane
Developed by the Department of Agriculture, Fisheries and Forestry, this excel spreadsheet is designed to assist growers in assessing the profitability in changes to their farm management practices.
Phone: 13 25 23 (DAFF)

Supplementary resources
SmartCane best management practice booklet series.
Developed by BSES, Canegrowers and EPA, this series of seven booklets provides an overview of general principles of best management practice related to various aspects of a crop cycle.
Phone: 3331 3333 (BSES Brisbane) 3864 6444 (Canegrowers Brisbane).

Wetlands management handbook
Farm Management Systems (FMS) guidelines for managing wetlands in intensive agriculture. Developed by the Australian and Queensland governments, as part of the Queensland Wetlands Program. The guide provides information to landholders and extension officers on:
Why consider improved practices?

There are expected economic benefits for farmers in transitioning towards a system of improved management practices. This is based on economic analyses that have been undertaken on farming system practices in each of the sugarcane producing regions of the Wet Tropics, Mackay-Whitsunday, Lower Burdekin and Burnett-Mary.

Economic analyses have shown that it is possible for a farming enterprise to improve profitability whilst operating with improved management practices. It is recommended that you assess your specific farming circumstances before undertaking any practice changes.

Is there any evidence that improved practices have a benefit for my farm?

Wet Tropics study one

Economic studies in the Tully region have indicated that adopting improved management practices may be economically viable. Benefits included a higher gross margin and positive net present value. This was demonstrated when the farm transitioned from C class to B class management practices over a five to 10 year period (26S & 23S).

Wet Tropics study two

In 2004, modelling of a typical farm near Cairns showed that incorporating improved practices of reduced tillage, legume fallow and reduced nitrogen application leads to an increase in income levels. Although this analysis indicated a small reduction in crop yield, financial returns were enhanced through a reduction in tillage operations, increased efficiencies and inputs over a full crop cycle. Overall, operating with these combined improved practices provides important economic benefits to a farmer at the plot level and provides positive effects on profitability (30S & 32S).

Mackay-Whitsunday

Economic analysis of a 150ha demo farm in the Mackay region indicated that transitioning to a system of improved management practices may have a negative impact on profitability over the short to medium term. Results demonstrated a higher farm gross margin when adopting practice changes. However, the substantial capital costs may result in a negative return on investment in...
some instances. It is recommended you assess your specific farming circumstances before changing any management practices (5S).

**Burdekin**

Economic analyses of demo farms in the Burdekin region have indicated that adopting improved management practices may be economically viable. Benefits included a higher gross margin and positive net present value. This was demonstrated when a farm transitioned from C class to B class management practices over a five to 10 year period (21S & 22S & 24S & 25S).

**Burnett-Mary**

A 2006 case study of a mixed cropping farm in the Burnett-Mary (943ha cane and 160ha peanuts), showed there are benefits in adopting improved management practices. The changes included controlled traffic with GPS, reduced tillage, scheduled flood irrigation and fallow legume cropping. The peanut crop was slashed, left on the ground and worked into the soil prior to planting the sugarcane. The study indicated a significant increase in gross margin over a projected 10 year timeframe with increases in labour efficiency and reduced tractor hours. Retaining peanut residue on the surface provided approximately 60 kg/ha of nitrogen. The tillage requirements for seed bed preparation were significantly reduced (11S).

**More information**

If you would like to contact DAFF about the information presented in this factsheet, contact us on: 13 25 23, for the cost of a local call within Queensland, or 07 3404 6999, or email us at; ReefPlan@daff.qld.gov.au
References


3S) Department of Agriculture, Fisheries and Forestry (2007), Bundaberg Grain in Cane. Canegrowers Case Study. Department of Agriculture, Fisheries and Forestry, Canberra.


