Joe and Christine Muscat have a long history of bringing innovation to the Mackay Whitsunday region. The couple grow sugarcane with rotational fibre crops on 130 Ha in the Oakenden area within the Sandy Creek catchment, South-West of Mackay.

The Muscat’s farm was fully converted to 1.8m rows with controlled traffic in 2008. They get the most out of the controlled traffic system by using RTK GPS guidance.

Upgrades to the Muscat’s farm, such as a change to zonal tillage and EC mapping for soil and nutrient management, have been funded through the Australian Government’s Reef Rescue/Reef Programme Water Quality Improvement Grants.

Through Project Catalyst Joe receives agronomic advice for on farm management which he says is invaluable. His farms have been EC mapped and soil tests are taken to guide his nutrient management. Nutrients are typically applied with Liquid One Shot and rates are varied by paddock. All fertilisers are applied under the stool using a variable rate stool splitter.

Herbicide management on the property is done early in the season with a mix of old and new pre-emergent sprays such as Flame and Velpar. “The majority of my weed control comes through double cropping with the rotational crops. The weeds are never out of control as they would be if I had a true fallow which means I use a lot less chemicals over all,” explained Joe.

Joe has been experimenting with rotational crops for more than fifteen years and in this time has brought new crops to the region and founded markets for legume, fibre, seed and oil crops.

Solution being tested

Controlled Release Urea offers the opportunity to better match nutrient supply to the plant growth needs resulting in improved nitrogen use efficiency and better water quality leaving Joe and Christine’s farm. In this trial Joe will try a combination of 25% CR-Urea and 75% urea blend.

Understanding the economic implications of a practice change is a vital step in the Project Catalyst trial process. If a practice has good economic outcomes it is worth investigating further and promoting to the wider community. If the economics do not stack up the team needs to go back to drawing board.

In order to evaluate the economic implications of CR-Urea on Joe’s farm an analysis estimating the profitability of the trial termed a Net Present Value (NPV) was completed. A gross margin (GM) was calculated before and after the trial to capture the changes in this production system. A NPV evaluates the future benefits in today’s dollar terms, this allows the capital costs incurred at the beginning of an investment period to be compared to the stream of benefits accrued across the investment period, and bought back into todays dollars terms.

Key economic drivers for change

- Increased nitrogen use efficiency
- Improved water quality
- Potential yield increases

Key assumptions

- Existing capital was able to be utilised
- Analysis assumes that change takes place across the whole farm
- 25% CR Urea and 75% Urea blend was used
- Inputs, CCS and yield were assumed to be the same over the 10 year

Results to date

It is expected that the change in farming practices will result in a negative change in gross margin and net present value. The results indicate that employing the proposed Agrocote/ Urea blend on ratooning blocks is unlikely to be an economically viable investment. This result is driven primarily by the higher price of the CR-Urea product, which ranges in terms of relative costs from between 1.75 to 10 times the cost of granular urea.

Left: Joe Muscat on his property in Oakenden. Joe has been experimenting with rotational crops for more than fifteen years and in this time has brought new crops to the region and founded markets for legume, fibre, seed and oil crops.

Below: In 2013, Joe received the Nuffield Scholarship supported by the Sugar Research and Development Corporation to support his research into best practice in production, manufacturing and marketing of fibre crops. The scholarship allowed Joe to take a six week tour of six countries to see numerous examples of how fibre crops are transformed into new products through secondary manufacturing.
**Grower Case Studies**

**Water quality benefits**

It is estimated that the Mackay Whitsunday community value a one per cent reduction in Dissolved Inorganic Nitrogen (DIN) at $1,038,995. The CR-Urea application has the potential for water quality benefits for the Sandy Creek catchment, although this is not directly quantified as yet. The table below shows the variance in DIN that has occurred in the past four years in the whole Sandy Creek catchment due to a mix of wet and drier years. It will take a whole crop rotation to have observed monitored load change in DIN.

**DIN monitored discharge from the Sandy Creek Catchment**

<table>
<thead>
<tr>
<th>Year</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in GM ($/ha)</td>
<td>-76</td>
<td>-76</td>
<td>-76</td>
<td>-76</td>
<td>-76</td>
<td>-76</td>
<td>-76</td>
<td>-76</td>
<td>-76</td>
<td>-76</td>
<td>-76</td>
</tr>
</tbody>
</table>

**Conclusion**

The Muscat’s trial highlights the negative economic consequences of CR-Urea given the high price of the product. The trial is still in the early stages and the potential benefits of the product are not fully understood nor are the water quality outcomes. The trial will continue to be monitored to improve the assumptions used in this analysis. All values used in this analysis are specific to the Muscat’s and if you are seeking to adopt this practice seek individual economic advice.

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**Bayer CropScience is proud to partner with the Project Catalyst Group, working with some of the most progressive growers in the Australian sugarcane industry. Together, Bayer CropScience and Project Catalyst growers are highlighting changes in the management practices of weeds, diseases and insects in the sugarcane industry.**

"Together, we're identifying solutions for more effective farming through innovative application techniques and trials," said Tim Murphy, Territory Sales Manager Bayer CropScience. "Working towards similar goals with growers and like-minded people involved with Project Catalyst is extremely rewarding."