

Energy Use in Cotton Picking

Improving Energy Efficiency on Irrigated Australian Cotton Farms

The Improving Energy Efficiency on Irrigated Australian Cotton Farms Project aims to deliver an industry-wide awareness campaign that provides tailored energy efficiency information and tools to irrigators and their advisors. This Activity received funding from the Department of Industry as part of the Energy Efficiency Information Grants Program.

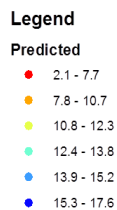
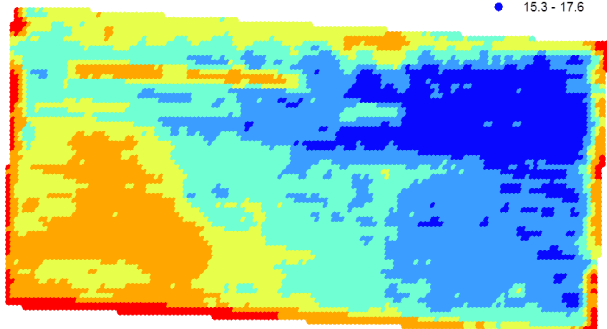
A Changing Industry

As the uptake of the Round Bale (RB) picking system has been widespread and rapid, it is not a matter of whether or not the industry should adopt this technology, rather a process of determining its impacts, evaluating impacts against previous harvesting systems, and developing strategies to optimise operating performance.

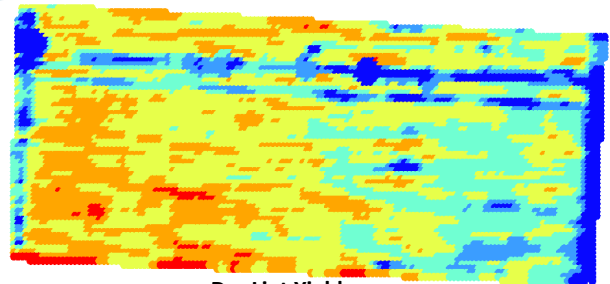
By engaging the industry in discussion and reviewing current information on harvesting system implementation and performance, the NCEA with funding from CRDC, seeks to determine a series of indicators that can assess field impacts and machine performance (including energy use) of RB pickers. An impact assessment framework will be constructed and refined over several cotton seasons of in-field monitoring of RB picking systems.

Variation in Fuel Use

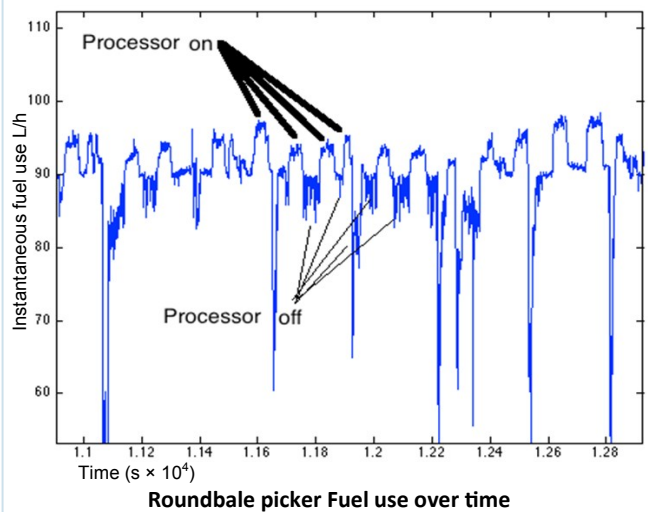
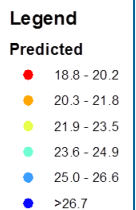
Fuel consumption in the new JD7760 is much more cyclical than with conventional pickers. This is due to the different method of processing the cotton.



Round bale module builders have a 40t operating weight compared to a 20t conventional basket picker. However there are significant advantages to the new system.



The advent of the accumulator (processor) on the new pickers means that there is sharp rise in fuel use when it is on, and a sharp drop when it is off. Fuel use for a JD7760 RB picker is shown in the below graphic. The peaks in the fuel use correspond with the processor compressing a bale.



Energy Use in Cotton Picking

| Type | Positives | Negatives |
|----------------------------|---|--|
| Conventional basket picker | <ul style="list-style-type: none"> • 20 t operating weight • Picker cheaper (\approx \$450k) but other equip needed (boll buggy (\$95k)+ tractor & builder (\$30k) + tractor). | <ul style="list-style-type: none"> • Associated equipment (boll buggies, module builders, etc) • 5+ operators • WH&S issues • Casual labour (backpackers) |
| Round bale picker | <ul style="list-style-type: none"> • Greater capacity • Increased time on task • Labour savings | <ul style="list-style-type: none"> • 40 t operating weight • Compaction • Yield reduction • Cost $<$\$1M + tele-handlers (\$130k) • Transportation costs • Moisture issues |



John Deere 7760 round bale picker

Current Work

In the new CRDC funded project “Assessing the impacts of new harvesting technologies on cotton through an impact assessment framework” the NCEA will be assessing how the new RB pickers compare to conventional pickers, not

For further information on Energy Use in Cotton Picking or the Improving Energy Efficiency on Irrigated Australian Cotton Farms project please contact the Cotton Research and Development Corporation on 02 6792 4088 or the CottonInfo Team member in your area.

just from an energy perspective, but also from a systems perspective. A summary of the pros and cons identified from recently held forums is included in the table above. There are some obvious advantages, however there are trade-offs to be made.

Moving Forward

Ongoing work at the NCEA includes the mapping and monitoring of energy usage, compaction studies, and completing the comparison between conventional pickers and the new round bale pickers.

Conclusion

The JD7760 is much bigger, more powerful and heavier than the conventional basket pickers, and as such uses considerably more fuel per hour. However, from a production perspective, anecdotal evidence suggests that the amount of fuel used by the new machine (on a per hectare basis) is comparable to conventional picking system (picker, boll buggy, module builder and transporter). The major benefit of the new machine is the reduce workforce required (and the WH&S implications) and the ease with which it can be picking at a new location should weather interfere. Data to fully document this systems approach is being collected as part of the CRDC project.

