

Sensors: where to next for sugarcane harvesters?

SRA researchers have worked collaboratively with the industry and leading technology experts to better understand opportunities for the future when it comes to harvesting sensors.

What's going on in your sugarcane harvester – in front, underneath, inside, and out the back? And can we use modern technology to get this information straight away, in the cab, to help the industry further improve harvesting efficiency?

These were two key questions that formed the premise of a recently completed research project that assessed where sensors could be used to make harvesting easier and more efficient, and which types of sensors might be suitable for different purposes.

The project consulted extensively with the industry to understand their thoughts on harvesting challenges and opportunities, especially around the use of sensors. Researchers spoke to growers, harvester operators and millers in group meetings and via a survey.

Following the consultation, the greatest opportunity identified was using sensors that would help the industry better measure and control extractor loss of cane and sugar.

"The industry already has methods for assessing sugar loss, such as the in-field sucrose loss measurement system," said SRA Program Manager, Dr Peter Samson. "These are proving themselves very effective with extension and adoption, but they have the disadvantage that they are expensive, slow, require significant labour, and don't provide results in real-time.

"The project identified that if we could produce a sensor that provides more data about sugar and cane loss, then

this is a sought-after opportunity for the Australian industry.

"This is not groundbreaking and has already been the subject of extensive research. However, there are new sensing technologies that were not tested in earlier work. It is important to understand that this remains a priority and opportunity for the industry, in addition to other priorities."

Industry consultation indicated that the focus for sensors should be on the measurement of losses, particularly from the primary extractor, automation of basecutter height control, and evaluation of cane supply quality entering the bin.

However, the project recommended that some other important factors such as topping, feedtrain optimisation, chopper box set up and crop presentation should be managed through continuing education, rather than sensing applications.

Sensors to measure basecutter height in relation to ground level are an important opportunity. Focus groups identified that basecutter height adjustment, to minimise dirt in cane from cutting too low and losses caused by cutting too high, is one of the most frequent adjustments a contractor makes in the field.

There are already basecutter height controllers in the industry but they seem to be mostly not in use because of a belief that current systems do not work. A current, simple solution in parts of the industry is a video camera mounted to the back of the harvester so that

the operator can see the ground job, although dusty conditions can impede the view.

Both major harvesting manufacturers offer automatic basecutter height controls, but there is work to be done in improving their use and understanding within the industry.

As part of all this, the project investigated at a range of sensing technologies that could be applicable for the cane industry. This includes near infra-red spectroscopy, spectral imaging, and radar.

The project also noted that there are challenges for sensors fitted inside a harvester. Sensors are sensitive instruments, and the inside of a cane harvester is not a friendly place for sensitive instruments. It is also important that a sensor not impede cane flow.

Dr Samson said all this information would now form a valuable foundation to help guide future research and investigation at SRA.

"SRA is approaching harvesting optimisation from a range of angles – both through research and adoption – and this project has established a strong foundation for the future." ■

(Above and Right) Modern harvesters put a diverse array of data at the fingertips of harvester operators. But a research project has worked with the industry to determine how this can be taken to the next level by collecting extra data that can optimise the harvest.



This project formed part of a larger project called Advancing the sugar industry value chain, which is funded by SRA and the Australian Government Department of Agriculture and Water Resources as part of the Rural R&D for Profit Program.

The final report for this project is available on the SRA website (<http://elibrary.sugarresearch.com.au/handle/11079/16450>).

For more information, contact:
Dr Peter Samson
PROGRAM MANAGER,
RESEARCH FUNDING UNIT
E psamson@sugarresearch.com.au
T (07) 3331 3303